

**MINISTRY OF HEALTH OF THE UZBEKISTAN**  
**TASHKENT STATE DENTAL INSTITUTE**



**L.A. ABDUAZIMOVA-OZSOYLU**

**INCREASE OF EFFICIEY NCOF DENTAL  
PROSTHETICS IN HARMFUL PRODUCTION CONDITIONS**

**MONOGRAPHY**

**TASHKENT 2024**

UDC: 616.314: 612.017

**Mualliflar:**

**Abduazimova-Ozsoylu L.A.** - Doctor of Philosophy (PhD) of Medical Sciences, Department of Pediatric Therapeutic Dentistry, TSDI

**Reviewers:**

Safarov M.T. -Tashkent State Dental Institute, Doctor of Medical Sciences, Professor,.

Gulomov S.S.-Tashkent Pediatric Medical Institute, Doctor of Medical Sciences, Professor, Head of the course of Pediatric Dentistry

In the monography the possibility of influence of metal alloys possessing pro-oxidant properties - Co, Fe, Cr - on the ability to restore the disturbed indicators of antioxidant system of the organism is considered. The basic mechanisms of the course of the periods of adaptation to dental prostheses, working in metallurgical production, the choice of optimal materials for the fabrication of fixed constructions of dental prostheses are disclosed. Innovative methods of research and their results are given.

This monograph is intended for general practitioners, dentists, clinical residents, masters and senior students of medical universities.

The monograph has been discussed by the Central Methodological Commission of the Tashkent State Dental Institute.

Protocol № .... from "....." 2024 г.

The monograph is recommended for publication by the Academic Council of the Tashkent State Dental Institute.

Protocol №...from "...."2024 г

## LIST OF ABBREVIATIONS

AZP - ascarbate-dependent lipid peroxidation

AOS - antioxidant system

APA - antiperoxide activity

HA – hydroperoxide

MDA - malonic dialdehyde

MMP - copper smelter

NADPH - nicotinamide dinucleotide phosphate reduced

NADPH - NADPH - dependent lipid peroxidation

OB - total protein

OL - total lipids

POL - lipid peroxidation

FFA - free fatty acids

SOD - superoxide dismutase

SROL - free-radical oxidation of lipids

TBA - 2-thiobarbituric acid

TTZ - Tashkent Tractor Plant

CHL – chemiluminescence

PRPP - Partial Removable Plate Prosthesis

The need for prosthetics of tooth row defects with removable prostheses in patients after 50 years of age reaches 56%, in younger age (40-50 years). removable prostheses are also used quite often There is no doubt that the technique of manufacturing dental prostheses, material science in prosthetic dentistry has made significant progress. Nevertheless, the number of patients dissatisfied with dental prostheses is not decreasing, but tends to increase. The researches of the staff of the chair of orthopedic dentistry under the direction of H.I. Irsaliev and N.L. Khabilov have shown that the process of adaptation to wearing dentures is influenced by various factors. In particular, the influence of residual monomer in the base structure of the dental prosthesis on the adaptation process has been established (Y.G. Romanova et al., 2012), different adaptive capabilities of the patient's organism in need of prosthetics (Kh.I. Irsaliev, 2001). A.I. Volozhin (2004) points out that the process of adaptation to dentures has a cortical character and depends on the type of higher nervous activity. Probably, unfavorable environmental conditions, harmful conditions of production, in which workers in need of prosthetic dental care are employed, have a certain role on the adaptive abilities of the patient.

Numerous scientific studies indicate that the prevalence of major dental diseases among the population reaches 95-100% (A.V. Alimsky, 1983; S.V. Lerina, 1987). At the same time, the facts testifying to the increase of complicated forms of diseases of odontogenic etiology are especially alarming (G.A. Khatskevich et al., 1989; V.A. Kozlov, 1993). It has been noted that, in general, the dental status of the country's population has a steady tendency to deteriorate (E.V. Borovsky, 1992; V.G. Butova, Y.M. Maksimovsky et al., 2000).

In the literature there are quite a lot of reports on the dental status of representatives of professional and social groups of the population, as well as on

the influence of occupational factors on dental morbidity (V.K.Kataeva, 2002; V.K.Dzugaev, 2003 A.A.Agafonov 2012). Analysis of the current state of the problem of complex assessment of the influence of various unfavorable factors of industrial environment on the formation and course of diseases of the oral cavity organs ( Abduazimov A.D., 1993; Zhumatov U.J., 1996; Volozhina A.I., 2004 ) allowed to reveal the relationship of general toxic effect with the features of functional and morphological changes in the oral cavity organs.

Data on the influence of microelements contained in polymetallic dust of the working zone air on the course of adaptation to dental prostheses, the need for prosthetics of workers employed in non-ferrous metallurgy in the literature available to us have not been found.

Dental prostheses, being an element of constant physical stimulus, not fully replacing the natural integral structures, lead to the development of secondary pathological changes of the oral cavity, associated with a violation of the structural organization of cell membranes (Habibullaeva I.A., 1993). Activation of lipid peroxidation process plays an important role in the development and course of a number of pathological processes.

In this connection, the study of adaptation processes to various constructions of dental prostheses is largely determined by the structural features of the cell membrane, the integrity of which depends on the level of regulation of free-radical reactions occurring in it and the lability of the protective antioxidant system.

S.S. Agzamkhodjaev (1998) notes the strengthening of processes of free-radical oxidation of lipids during the development of adaptation processes of the organism to dental prostheses and suggests the following of the organism to dental prostheses and suggests corrective antioxidant therapy.

At present, the dynamics of changes in the antioxidant system of the organism during the period of adaptation to dental prostheses is well studied, but there is no formulated idea about the reaction of this system, the course and terms of adaptation to different designs of dental prostheses in patients working in

conditions of increased content of polymetallic dust in the air, at enterprises for the production and processing of non-ferrous metals.

The current ecological situation clearly indicates the need for a more interested approach to the topic of human health, which cannot be delayed. Due to the rapid development of industry, around the enterprises there have been formed constantly expanding technogenic biochemical provinces with increased content of xenobiotics, heavy metals and other elements. At present, the problems of occupational pathology do not receive sufficient attention from both the structures managing production and public health authorities and medical personnel (B.P. Markov, V.N. Kozin, 2003). The main reason for underestimating the role of ecopathogenic risk in the development of dental diseases is the narrow specialization of practitioners and the associated lack of vision of the whole picture (K.A. Lebedev, N.B. Zhuruli, I.D. Ponyakina, 2007). Similar problems are faced by public health care in England, Denmark, Finland, Malaysia and Brazil (E.B. Tuna, O. Aktoren, Y. Oshida, 2010), J. Ahlberg (1996) believes that the organization of industrial dental care is not successful, despite better manpower and equipment than in public health care. Sulfur dioxide, vapors and oxides of manganese, chromium, phosphorus, zinc, cadmium even in minimal concentrations have a clear destructive effect on the human body (Pokrovsky V.A., 1979; Orishchenko V.I., 1991; Aida. S. et al., 1980). Thus, under prolonged exposure of the organism to phosphorus and its inorganic compounds, occupational diseases may develop in the form of toxic hepatitis (Kozlovsky V.A., Gubar M.P., 1982; Koelsch F., Misch I., 1927), atrophic and dystrophic changes in the mucous membrane of the upper respiratory tract, pulmonary emphysema (Sanotsky I.V. et al., 1979), changes in the bone system, manifested in increased brittleness of bones, sclerosing of epiphyseal ends, narrowing of the medullary canal of long tubular bones (Kasavina B.S. et al., 1989). Dentists have also paid attention to the negative influence of anthropogenic pollution on the condition of the dento-mandibular system (ShurL.F., 1977; Abduazimov A.D., 1988, 1991;. Drachinskaya

S.A., 1994; Kuzmina E.M. et al., 1997; Gileva O.S. et al., 1988, 2001; Zoloev R.V., 1997; Suleymanova I.D. et al., 1999; Soellberg K.B. et al., 1983; Spiechowicz E. et al., 1994).

Recently it was considered that there are no lesions of oral cavity tissues at the production facilities, where the maximum permissible concentrations of occupationally harmful substances, established by sanitary-hygienic norms, are observed. However, the data of T.V.Bastanzhieva, obtained in 1999 and the results of our research in 1986 showed that, even in compliance with sanitary-hygienic norms, workers of chemical enterprises may have lesions of hard tissues of teeth and periodontium. In this case, the action of "factors of low intensity" or hornless influence is manifested (Bushan M.G., 1979; Potiyko V.I. et al., 1988; Adamyan I.N. et al., 1988; Garazha H.H. et al., 1996; Nagy Z. et al., 1985). Workers who come into contact with sulfur dioxide, chromium compounds, manganese, inorganic phosphorus, mineral acids and alkalis, polymetallic dust and other anthropogenic contaminants during production activities, serious damage to the dento-mandibular system occurs (increased erasability, acid necrosis of tooth enamel, complicated caries with loss of most of the crown of the tooth, hyperesthesia of hard tissues of teeth, dysfunction of the temporomandibular joint, etc.). These diseases need not only therapeutic but also orthopedic treatment. (1975; Sedunov A.A. et al., 1990; Trefilov Y.A. et al., 1992; Zoloev R.V., 1997; Suleymanova I.D. et al., 1999; Watson A.O., 1989).

Dental care for workers of industrial enterprises provides neither adequate treatment nor prevention associated with the surrounding harmful conditions, and poor oral hygiene worsens the situation. The treatment and preventive, sanitary and hygienic measures carried out at industrial enterprises are insufficient, and the level of health indicators of workers desires better (Korytny D.L., Pekker R.E., 1985, Abduazimov A.D., 1990 ; Zoloev R.V., 1997; Zholmatov N.N., 2000).

According to the order of the Ministry of Health of the Russian Federation from 24.03.96 № 90 [ed. from 06.02.01.] "On the order of preliminary and periodic

medical examinations and medical regulations of admission to the profession"  
there are seven groups of occupational diseases:

1. Diseases caused by exposure to chemical factors. May occur in workers with chemicals with toxic properties (nitric acid, ammonia, benzene and its derivatives, sulfur, perhydrol, mercury and its compounds, lead and its inorganic compounds, tetraethyl lead, etc., pesticides used in agriculture, etc.).

2. Diseases caused by exposure to industrial aerosols. Can occur in workers in conditions of high content in the ambient air dust containing silicon dioxide in free and bound states, particles of coal, graphite, soot, metals, organic and artificial mineral fibers, plastics, plant fibers, etc.

3. Diseases caused by exposure to physical factors. Can occur in workers with radioactive substances, sources of ionizing, electromagnetic radiation, lasers, exposed to the action of intense industrial noise, vibration, etc., etc.

4. Diseases associated with physical overload and overstrain of individual organs and systems. May occur when performing work associated with intensive static-dynamic loads on the skeletal-muscular system, local muscle overloads, staying in a forced posture, requiring high coordination of movements, stereotyped movements, overstraining of the vocal apparatus, serving patients in psychiatric institutions, etc., as well as in the workplace.

5. Diseases caused by exposure to biological factors. Can occur when working in contact with infected sick people and animals, infected biological material, products of animal and plant origin (fur, skin processing, etc.), antibiotics, antibiotic-producing fungi, protein and vitamin concentrates, fodder yeast, mixed fodder, etc., etc.

6. Allergic diseases. May occur in work associated with substances and compounds of allergizing effect.

7. Neoplasms. May occur at work associated with the products of distillation of coal, oil, oil shale, components of glass fiber lubricants, other chemical compounds with carcinogenic properties, sources of ionizing radiation.

The development of new production processes, primarily chemical and biotechnological, has led to the emergence of conditions for professional contact with chemical and biological substances that are extremely toxic and allergenic [Kalashnikov A.A., 1992].

At the same time, in the conditions of the environmental situation that has changed significantly in recent years, due to increased emissions of toxic and allergenic substances into the atmosphere, it has become difficult to distinguish erased forms of some occupational diseases from etiologically not related to the production process at the victim's workplace [Brazhkin A.V., 1998 ; Mitchell L., Mitchell D., 1999].

Workers at enterprises are constantly exposed to many harmful production factors: polymetallic dust, gaseous substances (nitrogen oxides, sulfuric and sulfur dioxide, aerosols of nitric and sulfuric acids) and other physical components of the production environment: noise, vibration, high and low temperatures, air humidity and etc. (Bekmetov M.V., 1984; Gaffarov S.A., Mamedov F.M., 1999).

Industrial dust can be highly toxic, irritating, fibrogenic, carcinogenic, allergenic, or a combination of these. The harmful effects of dust particles most often depend on their shape, size and solubility in tissue fluids (Kuzminykh A.I., Konovalova N.B., 1984). The literature presents in sufficient detail the features of the clinical course and functional state of the organs and tissues of the oral cavity among workers in hazardous industries: isoprene rubber [Eremeeva N.V., 1980], timber processing complex [Levkin V.A., 1999], chemical industrial zone [Krazhan I.A., 1998], etc. The course of dental diseases among Air Force and civil aviation pilots has been studied in relatively detail [Jordanishvili A.K., 1998], helicopter pilots [Kovalevsky A.N., 2007], and people working on vibrating installations [Razgudarzi K., 2003].

Dental morbidity among workers in confectionery, bakery and flour milling industries is influenced by flour and sugar dust (Blot. 1985). In conditions of cadmium-zinc production, according to R.V. Zoloeva (1997), there is a complex

effect of harmful factors on the hard tissues of teeth: the decalcifying effect of cadmium, the abrasive effect of polymetallic dust, the necrotizing effect of industrial acids and the cauterizing effect of zinc.

In silumin production workers exposed to dust containing aluminum oxide and silicon dioxide, the prevalence of dental caries reached 94.3%, and the intensity of dental caries was 7.46. With increasing work experience, the number of carious teeth increased (Barannik N.G., 1976). According to Romanov Yu.G. In modern medicine, close attention is also paid to the impact of industrial production (coal, metallurgical, chemical, etc.) and the conditions of their activity on the health of workers, as well as the population living in close proximity to various production enterprises. Among such studies, the author notes in particular the study of workers of such enterprises; in modern dentistry there is a tendency to increase interest in the study of occupational morbidity in this population group, since since 2000 in Ukraine, as in a number of other countries, there has been an intensive increase in the number of various occupational diseases [6 ]. For example, some researchers have found that people employed in lead production experience significant changes in their dental status: the prevalence and intensity of dental caries increases, diseases of the oral mucosa occur, gingivitis is noted, a low level of hygiene is observed, the gingivitis index increases, a positive Schiller-Pisarev test is noted. Qualitative and quantitative changes occur in the organs, tissues and environments of the oral cavity: the rate of secretion decreases, the pH of saliva shifts to the acidic side, the viscosity and volume of oral fluid sediment increases; the threshold for the perception of tactile and pain sensitivity decreases and the level of mobilization of temperature receptors of the gum mucosa changes, the taste perception of the tongue changes. Chewing efficiency significantly decreases and the optical density of the jaw bones increases. As a result of the ingestion of cadmium and its compounds, disorders of the oral cavity are observed - gingivitis, catarrhal and ulcerative stomatitis, yellow-gold ring-shaped staining of the marginal gums, tooth enamel, changes in the structure of dentin. Opinions about

the mechanism of development of dental caries under the influence of cadmium are contradictory

It is known that caries resistance is determined not only by the condition of the tissues, but also by factors of the oral cavity, in particular oral fluid, changes in which reflect disturbances in the general condition of the body. The organs and tissues of the oral cavity have direct contact with mixed saliva, which is the most important medium for maintaining homeostasis throughout life. One of the most important properties of saliva is its protective function: mechanical, immunological, antibacterial. The constant flow of saliva and its moistening of the oral mucosa contribute to the preservation and strengthening of the organs and tissues of the oral cavity in an active functional state. The composition and properties of oral fluid are directly dependent on the functional state of the small and large salivary glands. It is known that a number of production factors can disrupt the functions of the salivary glands, sometimes indirectly, through their influence on the internal organs and systems of the body, changing its quantitative and qualitative indicators, as well as biochemical composition [Maksimovsky Yu.M., 1981; Leontiev V.K. et al., 1981].

The workers of the zinc plant V.I. Tikhonova (1972) observed an acceleration of the carious process, leading to tooth extraction more often than in the control group. She associated this with a decrease in the bactericidal ability of saliva and a shift in its pH to the acidic side.

The negative effect of fluoride pollution in the external production environment is well known and studied. This mainly happens at enterprises producing aluminum. The atmosphere around these factories is seriously polluted by fluorides, which are widely used in this production. Pollution of air and drinking water leads to fluorosis of bones and teeth in the population, which seriously worsens the health of the population. Such phenomena are observed everywhere where there are relevant industries. Under prolonged exposure to low concentrations of harmful substances, i.e. with chronic intoxication in the oral

cavity, both diseases of the mucous membrane and diseases of the teeth can occur (85, 25, 79). The result of exposure to vapors of aerosols of inorganic acids and their oxides is “acid or chemical necrosis.” On the crowns of workers' front teeth, a loss of natural shine, darkening of the enamel, increased abrasion of hard tissues, fragility and brittleness of teeth were observed. Abrasion and gradual loss of hard dental tissues led to the formation of gaps between teeth and a decrease in the height of the bite (Bekmetov M.V., 1984)

Pathological abrasion of teeth has been identified in production workers associated with aluminum dust (Kosyan A.K., Vormiadiryan A.B., 1966), in the woodworking industry due to exposure to chemically aggressive substances in sulfuric acid workshops, as well as in workers at a glass factory (Aizenshtein E.D., 1971), mineral fertilizers (Bekmetov M.V., 1984). Battey K.N. (1997) believed that in the area In dentistry, a current direction is to study the influence of production risk factors. Studies by a number of foreign authors have been devoted to studying the connection between harmful factors in the working environment and dental morbidity among workers (157, 164). In production workers, the incidence of dental caries and periodontal disease is higher than in controls (98, 148).

When studying the condition of the oral cavity of workers at a sulfuric acid plant and oil refinery exposed to sulfur dioxide, a change in the color of the enamel, loss of natural shine, and rough abrasion were revealed. As work experience increased, the incidence of dental diseases increased (145, 39). The results of the studies provided indicate an increase in damage to the hard tissues of teeth and an aggravation of the severity of periodontal pathology with age and with increasing length of service among workers in metallurgical production compared to the group not employed in metallurgy. Periodontal diseases accounted for 96.47%; among gingivitis, chronic catarrhal disease predominated.

A high prevalence of diseases of periodontal tissues and oral mucosa was revealed among workers in the production of trinitrotoluene (E.P. Karmanov,

1973). As a result of benzene poisoning, original pigment spots can be found on the mucous membrane - “extravasates” (R. Ya Shterengerts, 1974).

Z.I. Garayev (1974), when studying the dental status of sulfanol production workers, found that the predominant forms of oral pathology were enamel cracks and pathological abrasion of the enamel; Among the lesions of periodontal tissues is periodontal atrophy, and among the pathological changes in the oral mucosa is leukoplakia. When examining workers at superphosphate production enterprises (A.I. Marchenko, 1968; A.L. Dobrovolskaya, 1976; E. Domzalska, 1967), non-carious forms of pathology of hard dental tissues were identified, such as chips and cracks of enamel, dentin sensitivity, discoloration enamel from yellow to dark brown. A dirty gray mark was found on the vestibular surface of the incisors, which was not amenable to manual removal. During the examination of metallurgical workers, in particular aluminum production (T.K. Yanovskaya, 1980; T. A. Karagezyan, 1980; A.L. Madieva, 1995), pathology of the mucous membrane of the oral cavity and gums of an inflammatory nature was revealed already in the first year of work surveyed. Violation of the elasticity of the capillaries of the soft tissues of the oral cavity leads to the appearance of pigment spots. Leukoplakia also had a high frequency. Among the pathologies of periodontal tissues, the second place is occupied by periodontal atrophy, characterized by degenerative tissue changes.

M.V. Bekmetov (1991), during an examination of workers at chemical enterprises, discovered damage to the hard tissues of teeth in the form of chemical necrosis and pathological abrasion. At cement enterprises, a high level of dental morbidity has been established for the main nosological units - caries, non-carious lesions, periodontal pathology and oral mucosa. Characteristic forms of pathology of the oral mucosa were leukoplakia and heiligs (R.E. Purinya, 1968; E.P. Karmanov, 1991). In addition, workers complained of a burning sensation on their tongue. In the work of A.D. Abduazimov (1988, 1990, 1992, 1993), the author explains the development of non-carious lesions and pathology of the oral mucosa

of workers by the influence of polymetallic dust. The pathogenetic mechanism is due to the solubility of chemicals in oral fluid and a decrease in pH. Using the neutron-Activation analysis by the author found up to 15 microelements in the composition of saliva, dental calculus, blood and teeth, among which the leading place was occupied by lead, copper, zinc, etc.

Among the workers of the enterprise for the production of construction materials, N. E. Dobrovolskaya (1993) revealed a high percentage of non-carious lesions and pathology of the oral mucosa. R.V. Zoloev (1997) found that cadmium and zinc salts are adsorbed on the soft tissues of the oral cavity, thereby contributing to the development of pathological changes in them. Information about the effect of these chemicals on dentures in the oral cavity is also summarized.

For workers in tobacco production, Tappeiner's leukoplakia is typical, which amounted to 29%, and among workers in chemical production, among the diseases of oral mucosa, verrucous 14% and flat 4% forms of leukoplakia, respectively, predominated (A.A. Ravinskaya, 1998).

Among workers in Indian candy shops, the harmful effects of elevated ambient temperatures on the body, especially in the summer season, were determined, resulting in strain on the functions of the circulatory system (124).

Bakery and confectionery workers have been found to be at increased risk of developing dental caries due to the nature of their occupation and diet (151). During operation of production equipment, noise is generated. The equivalent sound pressure level in the working areas of food enterprises exceeds normal levels and amounts to 82-88 dB. It was revealed that most often when exposed to noise, workshop workers complain of increased irritability, emotional lability, restless sleep, headaches and dizziness, increased fatigue, and general weakness. Such a factor as vibration from technological equipment when working with it does not belong to the main ones, since its level, as a rule, does not exceed the normal limits.

In metalworking workshops, the air environment is usually contaminated with metal dust while working with metal on equipment. Even if a given air pollution is not severe, the nature and concentration of metal dust in it can fluctuate during the working day and reach levels above normal values, depending on the characteristics of the technological activity (142). HER. Olesov and co-authors analyzed the prevalence and intensity of dental caries in young workers with hazardous working conditions. Among the examined individuals, the CP index was  $10.4 \pm 2.1$ . In the structure of the CP, teeth affected by caries account for  $3.5 \pm 0.5$ ; filled teeth -  $6.0 \pm 1.0$ ; number of teeth removed -  $0.9 \pm 0.1$ .

Research conducted by L.I. Gitina (1980) showed that in workers exposed to lead, one of the early signs of saturnism is the formation of a lead border along the edge of the gums and the presence of pigment spots on the mucous membrane of the lips and cheeks. Clinically, the phenomena of catarrhal, more often hypertrophic gingivitis were noted. Inflammatory outbreaks were accompanied by bleeding gums, profuse purulent discharge, rapidly progressing alveolar bone resorption and loosening of teeth. For patients in contact with lead, the rapid formation of periodontal pockets of varying depths is very typical.

Relevant today are studies of the oral health of workers in the coal mining industry (8), dental morbidity in ammonia production workers (9), the incidence of caries and generalized periodontitis among sailors (10), and diseases of the oral mucosa in miners (3). The authors of these studies agree that human activity in difficult production conditions inevitably lead to the development of occupational diseases. The influence of chemical compounds on the human body and its tissues can manifest itself at the submolecular, molecular and cellular levels, leading to changes in metabolic processes in the tissues of the oral cavity and the body as a whole. Thus, researchers have proven the negative impact of iron ore dust, vibration, noise, temperature fluctuations on the condition of various tissues of the dental system. These working conditions are considered to be the main etiological factor in the development of the disease lichen planus (13,14). In addition, it is

noted that miners have a wide range of diseases of the oral mucosa and periodontal tissues. The structure, prevalence and severity of these diseases are directly dependent on the length of work in hazardous conditions (14). The production environment of an ammonia enterprise also contributes to the development of dental morbidity, since the content of chemicals in the air of production premises, especially in workshops where finished products are stored, is several times higher than the maximum permissible standards (15, 18). Thus, as the researchers note, special working conditions, together with the characteristics of the chemical composition of the air, negatively affect the health and dental status of workers at industrial enterprises (10).

Industrial factors of mechanical, chemical and thermal origin are provoking factors leading to the development of leukoplakia of the oral mucosa. The results of the study by L. Feller et al. (146) in this aspect also confirm this hypothesis.

Leukoplakia of the oral mucosa can occur as an occupational disease in individuals working in chemical production or in workshops with high temperatures (128, 136, 162). Taste sensitivity of tongue receptors in persons working for a long time in conditions high temperature is characterized by significant changes: taste sensitivity to sweets decreases on average by 2.5 times, to salty - by 1.4 times, to bitter - by 4.9 times.

Among glass production workers, diseases of the oral mucosa were identified in 75 workers, their prevalence was 53.4% (in the control group 28.6%). The most common disease of the oral mucosa among glass factory workers is leukoplakia (53%), and in the control group the value of the identified nosology was 28%.

According to A.A. Agafonova (2012), thermal power plant workers from the first years of work have a low level of secretory immunoglobulin A in mixed saliva compared to the control group ( $0.68 \pm 0.55$  g/l and  $0.63 \pm 0.06$  g/l, respectively). The activity of lysozyme in the saliva of workers is significantly lower than in the control group ( $52.7 \pm 0.67\%$  and  $62.7 \pm 1.29\%$ , respectively). In workers of the main

group, in contrast to the control group, the pH of saliva shifts to the acidic side (17).

According to Dominik (1967), polymetallic dust, acting on the body of metallurgical and engineering workers, causes inflammation of the oral mucosa with a characteristic coloration of the gums. According to the author, copper formed a green coating on the teeth, iron-brown spots on the border of the gums, silver gave the gums a gray color, lead - a characteristic dark color.

M.Ya. Smolyar (1968) noted in his work that as a result of local exposure to soot dust on the mucous membrane of the gums, limited and generalized inflammation of the gums occurred, manifested in their bleeding and vulnerability. He explained this by the extremely low dispersion of dust (0.3 - 0.4 microns), the specific density of soot dust (70- 80 mg/g), prone to the formation of toxic gases and other irritants.

Iron ore workers have an increased incidence of diseases of the tissues and organs of the mouth. This fact is explained by the fact that they are exposed to mining dust earlier than others. With increasing professional experience, the frequency of lesions of the oral mucosa, periodontal and hard dental tissues increases (44). Dust from iron ore production, containing free silicon dioxide in crystalline form (quartz) and iron oxides, enters the oral cavity and is retained in it, depositing in the largest quantities in dental plaque. Chronic injury to the oral mucosa by iron ore dust causes changes in the epithelium in the form of hyperkeratosis, increases the intensity of periodontal pathology, increases xerostomia, and changes the biocenosis of the oral cavity. Quartz-silicate dust has a chronic immunosuppressive effect. The consequence of direct local exposure to iron ore dust is non-carious lesions of hard dental tissues, which occur in workers 16.4% more often than in people not involved in iron ore production. Iron ore dust, getting on the chewing surface of the teeth, has an abrasive effect, promoting faster grinding of hard dental tissues and the formation of enamel cracks.

A dental examination of 14,519 metallurgical workers conducted by Ressayk R. et al (1979) revealed various diseases of the oral cavity in 89%. The majority of those examined had diseases of the oral mucosa, and to a lesser extent, diseases of the teeth. According to the authors, the main harmful factors affecting the workers' bodies were metal dust and high temperature.

When and the study of dental morbidity among workers in the production of chlorophenoxy herbicides revealed a high intensity caries ( $KPUz = 12.7 \pm 4.9$ ) compared with the control group ( $KPUz = 10.44 \pm 0.72$ ), there was a high prevalence of periodontal pathology (100%) with a predominance of severe forms. A high prevalence of diseases of the oral mucosa and lips was revealed: it was  $96.0 \pm 4.0\%$ , while in the control group the studied value was  $38.2 \pm 2.3\%$ . The red border of the lips was most often affected ( $91.0 \pm 2.9\%$ ) (18). When analyzing the results of epidemiological indicators of the condition of periodontal tissues, it becomes obvious that there is a gradual increase in the prevalence of signs of periodontal disease as underground work experience in an iron mine increases. A critical pH level and hyposalivation have a depressive effect on the homeostasis of the oral fluid, which undoubtedly leads to an increase in the incidence of pathology of the oral mucosa in the miner's environment (19).

V.N. Olesova et al. (2008) examined male workers with extensive work experience, aged from 55 to 64 years, exposed to chemical and radiation production factors. The prevalence of caries in all groups examined reached 100%. The intensity of caries according to the CP index varied markedly: the highest CP index was recorded among workers in particularly hazardous industries 262.

In the studies of Z.Ya. Yusupova et al. On the influence of technogenic factors on the dental system ( $18.4 \pm 3.3$ ), the frequency of detection of complete destruction of the coronal part of the tooth was significant. The prevalence of diseases of the oral mucosa reached 27.4%, which was 2 times higher than the corresponding figure in the control group (20).

A comprehensive dental examination of workers associated with the production of mineral fertilizers showed an excess of the caries intensity indicator compared to the Russian average. So, in the key age group of 35-44 years, the intensity of caries in workers is 15.2 (K - 2.2; P - 6.5; U - 6.5). On average for Russia, the corresponding indicators are 13.14 (3, 14, 15.16). This excess begins with the age group over 25 years and worsens with increasing work experience. A high rate of dental caries intensity among workers in hazardous industries, according to Ya.N. Garusa et al. (2006), is associated with a large number of extracted teeth. Against the background of a large number of filled teeth in the intensity structure, the main reason for tooth removal appears to be periodontal disease, possibly aggravated by hazardous production conditions (14). When studying the characteristics of dental caries in 1077 gas processing plant workers, the following indicators were analyzed: the prevalence of dental caries depending on professional experience; intensity of dental caries damage per examined person. Among the examined individuals, the overall prevalence of the disease is  $90.5 \pm 1.06\%$ , and the overall intensity of dental caries is  $10.05 \pm 1.05$ . Production work experience directly influenced the studied indicators. Thus, with an experience of 1-5 years, the prevalence of caries was  $86.5 \pm 1.58\%$ , intensity -  $8.2 \pm 0.69$ . With increasing experience (16 years or more), these figures increased, respectively, to  $96.0 \pm 1.42\%$  and 16.7 (21).

When analyzing dental morbidity in the aluminum industry by type of disability over the past 5 years, the authors [22] found that among diseases, the largest share in cases of disability are odontogenic inflammatory diseases (58.65% of all cases of disability), which indicates the critical importance of planned sanitation of the oral cavity of workers at industrial enterprises in the complex of preventive measures.

Scientific works in recent years (23, 24) present data on the influence of unfavorable chemical factors on the oral fluid of workers. It has been established that in persons in contact with chemical pollutants in the industrial environment,

the condition of the oral organs, the biochemistry of tissues and fluids of the oral cavity are in an unfavorable state. Persons working in chemical production or in high-temperature workshops have a high risk of developing leukoplakia of the oral mucosa (25-28). The results of numerous studies indicate the adverse impact of man-made emissions on the dental health of the population (19, 23). It is known that the health status of children is a relatively sensitive indicator when assessing the adverse effects of environmental pollution on the body.

According to S.T. Guseinova (2009), the “K” indicator (uncomplicated caries) in the population living in an environmentally unfavorable area is 0.98 teeth, versus 0.82 teeth in the control area, the “P” indicator (caries complications subject to treatment) is 0.45 teeth, versus 0.31 teeth, indicator “U” (removed teeth) – 7.63 teeth versus 6.47 teeth, indicator “X” (complications of caries that need to be removed) – 0.74 teeth, versus 0.59 teeth, indicator “P” (filled teeth) – 0.11 teeth, versus 0.36 teeth. In an ecologically unfavorable area, out of the total index of the total coefficient of physical education (9.91 teeth), 7.63 are extracted teeth; in the control area, out of 8.55 teeth, 6.47 are extracted teeth. Consequently, 76.9-78.0% of the PCI indicator accounts for the share of extracted teeth (9).

Lead affected the blood vessels of the oral mucosa, increasing their permeability (Letavet A.A., 1965). M.T. Rakhimova (1972) found a decrease in lead-zinc production workers barrier function of the mucous membrane, salivary lysozyme titer and accumulation of bacteria in the oral cavity.

A decrease in the phagocytic activity of leukocytes and the adsorption capacity of epithelial cells, compared to the control, was detected in 276 zinc production workers, which led to an exacerbation of catarrhal gingivitis and periodontitis (Tikhonova V.N., 1975). Alifbaeva S.A. (1990) revealed a high degree of damage to periodontal tissue among workers at a copper smelter - from 5% to 78.8% of cases.

The frequency of periodontal damage was directly dependent on the severity of occupational intoxication (Gitina L.I., 1970; Strazdina T.V., 1975). In the most

harmful workshops, bleeding gums, looseness, hyperemia, swelling were detected, and a large amount of dental plaque was noted. Lead, magnesium, copper, iron, phosphorus and aluminum were found in large quantities in tartar.

According to Egorov F.F. (1972), Rodina B.I. (1977) among working riveters systematically exposed to noise and vibration, periodontal disease was detected in almost 100% of those examined.

Pakhomov (1982), A.P. Grokholsky and T.N. Faizullaev (1982), Wand Su Wen et al., (1986) revealed the dependence of the course of physiological and pathological processes in teeth and periodontal tissues on the concentration of microelements in tartar, hard tissues of teeth, saliva, blood, urine. According to the authors, the high content of copper, zinc, manganese influenced dental tissues, changing their structure and chemical composition, affected dental plaque, influenced the properties and chemical composition of saliva and oral microflora, changed the properties of saliva and dental tissues (Kodola N. L., Kononovich E.V., 1978).

A significant accumulation of silicon was found in the dental stones of glass production workers (Aizenstein, 1971).

An analysis of domestic and foreign literature on the issue under discussion has shown that the study of compensatory and adaptive processes in the oral cavity in workers exposed to metals contained in polymetallic dust before and during the process of adaptation to dentures remains not fully disclosed and relevant.

The work of many authors is devoted to the study of adaptation processes to various designs of dentures. The need for prosthetics of dentition defects with removable dentures in patients after 50 years of age reaches 56%; at a younger age (40–50 years), removable dentures are also used quite often (from 15 to 20%) [48, 78]. Orthopedic dental treatment is not only a local intervention, but also affects the body as a whole. At the same time, one of the main problems that attracts the attention of the authors is the patient's adaptation to the orthopedic design [36, 39, 100, 163, 174]. When using removable dentures, inflammatory disorders often

occur, leading to persistent morphological and functional disorders of the tissues of the prosthetic bed [9, 154]. Age-related changes in the oral mucosa disrupt microcirculation like arteriosclerosis. The use of removable plate prostheses against this background contributes to pronounced hemodynamic disturbances, an increase in the phenomena of tissue hypoxia and, as a consequence, the development of chronic inflammation, depending on the type of structures and the duration of use of the prostheses [88]. With age, the regenerative ability of the epithelium decreases, the severity of signs of a chronic inflammatory process increases [111], a gradual suppression of immunological reactivity is observed: the phagocytic and secretory activity of tissue macrophages, the titer of salivary lysozyme, the functional activity of T-, B-lymphocytes decrease, and a deficiency occurs. production of immunoglobulins [13, 44]. In this regard, a promising and relevant direction is the search for new highly effective drugs that, along with high therapeutic activity, would have a minimum of side effects, which is especially important for elderly patients. Today, there are preparations based on titanium glycerosolvate (trademark "Tizol®"), which are an effective means of drug therapy for the oral mucosa and widely used in dentistry for the treatment of periodontal diseases [123]. However, these drugs are not used in clinical practice for the orthopedic treatment of elderly patients with removable laminar dentures. To increase the effectiveness of the effect of these drugs on the oral mucosa of elderly patients, their combination with biologically active magnesium-containing medicinal substances of natural origin is possible [98, 140, 141]. For example, S.A. Zufarov (1982) highlights:

1. neuroreceptor adaptation of various types of sensitivity (tactile, pain, taste, etc.);
2. occlusal and articulatory adaptation;
3. phonetic adaptation;
4. morpho-functional adaptation of the tissues of the prosthetic bed;
5. adaptation of the oral environment.

The process of adaptation of organs and tissues of the oral cavity to new operating conditions includes changes in the hemodynamics of the periodontium of remaining teeth, immune status, morphological picture of periodontal tissues, etc.

The development of reactions of the prosthetic bed is based on various pathogenetic mechanisms, the nature of which is determined by the characteristics of the stimuli emanating from the design of the prosthesis. The intensity, nature, duration and field of their influence depend on the design features of the prosthesis, the quality of technical manufacturing and the properties of the material (Gavrilov E.I., 1973; Zufarov S.A., Rutkovsky K.V..1982, Irsaliev Kh.I.. 1993, Safarov T.Kh. 1997, Aripova G.E., 1998). The following types of action of the bases of removable laminar dentures are distinguished: traumatic, allergic, toxic, side.

The main causes of focal inflammation of the mucous membrane oral cavity under the prosthesis, according to Z.S. Vasilenko (1968) are roughness on the inner surface of the prostheses, long and sharp edges dentures, deformed denture base, increased chewing pressure in the absence of multiple contacts of artificial teeth, poor fixation and stabilization of dentures, sharp bone protrusions.

The author of an active analysis identified up to 15 microelements in the composition of saliva, tartar 433, blood and teeth, among which the leading place is occupied by lead, copper, zinc, etc. Among workers at enterprises producing construction materials, N. E. Dobrovolskoy (1993) revealed a high percentage of non-carious lesions and reliability of closure of the oral cavity. R.V. Zoloev (1997) found that cadmium and zinc salts are adsorbed on the soft tissues of the oral cavity, thereby contributing to the development of pathological changes in them. Information has also been published on the effect of these nutrients on dentures in the oral cavity.

For workers in tobacco production, Tappeiner's leukoplakia is typical, which amounted to 29%, and among workers in chemical production, among the diseases of oral mucosa, verrucous 14% and flat 4% forms of leukoplakia, respectively,

predominated (A.A. Ravinskaya, 1998). Among workers in Indian candy shops, the harmful effects of elevated ambient temperatures on the body, especially in the summer season, were determined, resulting in strain on the functions of the circulatory system (124).

Bakery and confectionery workers have been found to be at increased risk of developing dental caries due to the nature of their occupation and diet (151). During operation of production equipment, noise is generated. The equivalent sound pressure level in the working areas of food enterprises exceeds normal levels and amounts to 82-88 dB. It was revealed that most often when exposed to noise, workshop workers complain of increased irritability, emotional lability, restless sleep, headaches and dizziness, increased fatigue, and general weakness. Such a factor as vibration from technological equipment when working with it

Does not belong to the main ones, since its level, as a rule, does not exceed the normal limits. In metalworking workshops, the air environment is usually contaminated with metal dust while working with metal on equipment. Even if a given air pollution is not severe, the nature and concentration of metal dust in it can fluctuate during the working day and reach levels above normal values, depending on the characteristics of the technological activity (142). HER. Olesov and co-authors analyzed the prevalence and intensity of dental caries in young workers with hazardous working conditions. Among the examined individuals, the CP index was  $10.4 \pm 2.1$ .

In the structure of the CP, teeth affected by caries account for  $3.5 \pm 0.5$ ; filled teeth –  $6.0 \pm 1.0$ ; number of teeth removed –  $0.9 \pm 0.1$ . Research conducted by L.I. Gitina (1980) showed that in workers exposed to lead, one of the early signs of saturnism is the formation of a lead border along the edge of the gums and the presence of pigment spots on the mucous membrane of the lips and cheeks. Clinically, the phenomena of catarrhal, more often hypertrophic gingivitis were noted. Inflammatory outbreaks were accompanied by bleeding gums, profuse

purulent discharge, rapidly progressing alveolar bone resorption and loosening of teeth.

For patients in contact with lead, the rapid formation of periodontal pockets of varying depths is very typical. Relevant today are studies of the oral health of workers in the coal mining industry (8), dental morbidity in ammonia production workers (9), the incidence of caries and generalized periodontitis among sailors (10), and diseases of the oral mucosa in miners (3). The authors of these studies agree that human activity in

Difficult production conditions inevitably lead to the development of occupational diseases. The influence of chemical compounds on the human body and its tissues can manifest itself at the submolecular, molecular and cellular levels, leading to changes in metabolic processes in the tissues of the oral cavity and the body as a whole. Thus, researchers have proven the negative impact of iron ore dust, vibration, noise, and temperature fluctuations on the condition of various tissues of the dental system. These working conditions are considered to be the main etiological factor in the development of the disease lichen planus (13,14). In addition, it is noted that miners have a wide range of diseases.

The structure, prevalence and severity of these diseases are directly dependent on the length of work in hazardous conditions (14). The production environment of an ammonia enterprise also contributes to the development of dental morbidity, since the content of chemicals in the air of production premises, especially in workshops where finished products are stored, is several times higher than the maximum permissible standards (15, 18). Thus, as the researchers note, special working conditions, together with the characteristics of the chemical composition of the air, negatively affect the health and dental status of workers at industrial enterprises (10).

Industrial factors of mechanical, chemical and thermal origin are provoking factors leading to the development of leukoplakia of the oral mucosa. The results

of the study by L. Feller et al. (146) in this aspect also confirm this hypothesis. Leukoplakia of the oral mucosa can occur as an occupational disease in individuals working in chemical production or in workshops with high temperatures (128, 136, 162). Taste sensitivity of tongue receptors in persons working for a long time in conditions

High temperature is characterized by significant changes: taste sensitivity to sweets decreases on average by 2.5 times, to salty – by 1.4 times, to bitter – by 4.9 times. Among glass production workers, diseases of the oral mucosa were identified in 75 workers, their prevalence was 53.4% (in the control group 28.6%). The most common disease of the oral mucosa among glass factory workers is leukoplakia (53%), and in the control group the value of the identified nosology was 28%

According to A.A. Agafonova (2012), thermal power plant workers from the first years of work have a low level of secretory immunoglobulin A in mixed saliva compared to the control group ( $0.68 \pm 0.55$  g/l and  $0.63 \pm 0.06$  g/l, respectively). The activity of lysozyme in the saliva of workers is significantly lower than in the control group ( $52.7 \pm 0.67\%$  and  $62.7 \pm 1.29\%$ , respectively). In workers of the main group, in contrast to the control group, the pH of saliva shifts to the acidic side (17).

According to Dominik (1967), polymetallic dust, acting on the body of metallurgical and engineering workers, causes inflammation of the oral mucosa with a characteristic coloration of the gums. According to the author, copper formed a green coating on the teeth, iron-brown spots on the border of the gums, silver gave the gums a gray color, lead – a characteristic dark color. M.Ya. Smolyar (1968) noted in his work that as a result of local exposure to soot dust on the mucous membrane of the gums, limited and generalized inflammation of the gums occurred,

M.Ya. Smolyar (1968) noted in his work that as a result of local exposure to soot dust on the mucous membrane of the gums, limited and generalized

inflammation of the gums occurred, manifested in their bleeding and vulnerability. He explained this by the extremely low dispersion of dust (0.3 – 0.4 microns), the specific density of soot dust (70-80 mg/g), prone to the formation of toxic gases and other irritants. Iron ore workers have an increased incidence of diseases of the tissues and organs of the mouth. This fact is explained by the fact that they are exposed to mining dust earlier than others. With increasing professional experience, the frequency of lesions of the oral mucosa, periodontal and hard dental tissues increases (44). Iron ore dust containing 80 mg/g, prone to the formation of toxic gases and other irritants. Iron ore workers have an increased incidence of diseases of the tissues and organs of the mouth. This fact is explained by the fact that they are exposed to mining dust earlier than others. With increasing professional experience, the frequency of lesions of the oral mucosa, periodontal and hard dental tissues increases (44). Iron ore dust containing Free silicon dioxide in crystalline form (quartz) and iron oxides entering the oral cavity are retained in it, depositing in the largest quantities in dental plaque. Chronic injury to the oral mucosa by iron ore dust causes changes in the epithelium in the form of hyperkeratosis, increases the intensity of periodontal pathology, increases xerostomia, and changes the biocenosis of the oral cavity. Quartz-silicate dust has a chronic immunosuppressive effect. The consequence of direct local exposure to iron ore dust is non-carious lesions of hard dental tissues, which occur in 16.4% of workers.

Related to iron ore production. Iron ore dust, getting on the chewing surface of the teeth, has an abrasive effect, promoting faster grinding of hard dental tissues and the formation of enamel cracks. A dental examination of 14,519 metallurgical workers conducted by Ressayk R. Et al (1979) revealed various diseases of the oral cavity in 89%. The majority of those examined had diseases of the oral mucosa, and to a lesser extent, diseases of the teeth. According to the authors, the main harmful effects on the body of workers are

A dental examination of 14,519 metallurgical workers conducted by Ressayk R. Et al (1979) revealed various diseases of the oral cavity in 89%. The majority of those examined had diseases of the oral mucosa, and to a lesser extent, diseases of the teeth. According to the authors, the main harmful factors affecting the workers' bodies were metal dust and high temperature.

When studying dental morbidity among workers producing chlorophenoxy herbicides, a high intensity was revealed

Caries ( $KPU_z = 12.7 \pm 4.9$ ) compared with the control group ( $KPU_z = 10.44 \pm 0.72$ ), there was a high prevalence of periodontal pathology (100%) with a predominance of severe forms. A high prevalence of diseases of the oral mucosa and lips was revealed: it was  $96.0 \pm 4.0\%$ , while in the control group the studied value was  $38.2 \pm 2.3\%$ . The red border of the lips was most often affected ( $91.0 \pm 2.9\%$ ) (18). When analyzing the results of epidemiological indicators of the condition of periodontal tissues, it becomes obvious that there is a gradual increase in the prevalence of signs of periodontal disease as underground work experience increases.

A critical pH level and hyposalivation have a depressive effect on the homeostasis of the oral fluid, which undoubtedly leads to an increase in the incidence of pathology of the oral mucosa in the miner's environment (19). V.N. Olesova et al. (2008) examined male workers with extensive work experience, aged from 55 to 64 years, exposed to chemical and radiation production factors. The prevalence of caries in all groups examined reached 100%. The intensity of caries according to the CP index varied markedly: the highest CP index was recorded among workers in particularly hazardous industries 262.

In the studies of Z.Ya. Yusupova et al. On the influence of technogenic factors on the dental system ( $18.4 \pm 3.3$ ), the frequency of detection of complete destruction of the coronal part of the tooth was significant. The prevalence of diseases of the oral mucosa reached 27.4%, which was 2 times higher than the corresponding figure in the control group (20). A comprehensive dental

examination of workers associated with the production of mineral fertilizers showed an excess of the caries intensity indicator compared to the Russian average.

In the key age group of 35-44 years, the intensity of caries in workers is 15.2 (K – 2.2; P – 6.5; U – 6.5). On average for Russia, the corresponding indicators are 13.14 (3, 14, 15.16). This excess begins with the age group over 25 years and worsens with increasing work experience. A high rate of dental caries intensity among workers in hazardous industries, according to Ya.N. Garusa et al. (2006), is associated with a large number of extracted teeth. Against the background of a large number of filled teeth in the intensity structure, the main reason for tooth removal appears to be periodontal disease, possibly aggravated by hazardous production conditions (14).

When studying the characteristics of dental caries in 1077 gas processing plant workers, the following indicators were analyzed: the prevalence of dental caries depending on professional experience; intensity of dental caries damage per examined person. Among the examined individuals, the overall prevalence of the disease is  $90.5 \pm 1.06\%$ , and the overall intensity of dental caries is  $10.05 \pm 1.05$ . Production work experience directly influenced the studied indicators. So, with 1-5 years of experience

The prevalence of caries was  $86.5 \pm 1.58\%$ , intensity –  $8.2 \pm 0.69$ . With increasing experience (16 years or more), these figures increased, respectively, to  $96.0 \pm 1.42\%$  and 16.7 (21). When analyzing dental morbidity in the aluminum industry by type of disability over the past 5 years, the authors found that among diseases, the largest share in cases of disability are odontogenic inflammatory diseases (58.65% of all cases of disability), which indicates the critical importance of planned sanitation of the oral cavity of workers at industrial enterprises in the complex of preventive measures.

Scientific works in recent years (23, 24) present data on the influence of unfavorable chemical factors on the oral fluid of workers. It has been established

that in persons in contact with chemical pollutants in the industrial environment, the condition of the oral organs, the biochemistry of tissues and fluids of the oral cavity are in an unfavorable state. Persons working in chemical production or in high-temperature workshops have a high risk of developing leukoplakia of the oral mucosa (25-28). The results of numerous studies indicate the adverse impact of man-made emissions on the dental health of the population (19, 23)

It is known that the health status of children is a relatively sensitive indicator when assessing the adverse effects of environmental pollution on the body. According to S.T. Guseinova (2009), the “K” indicator (uncomplicated caries) in the population living in an environmentally unfavorable area is 0.98 teeth, versus 0.82 teeth in the control area, the “P” indicator (caries complications subject to treatment) is 0.45 teeth, versus 0.31 teeth, “U” index 7.63 teeth versus 6.47 teeth, indicator “X” (complications of caries that need to be removed) – 0.74 teeth, versus 0.59 teeth, indicator “P” (filled teeth) – 0.11 teeth, versus 0.36 teeth. In an ecologically unfavorable area, out of the total index of the total coefficient of physical education (9.91 teeth), 7.63 are extracted teeth; in the control area, out of 8.55 teeth, 6.47 are extracted teeth. Consequently, 76.9-78.0% of the PCI indicator accounts for the share of extracted teeth (9). Lead affected the blood vessels of the oral mucosa, increasing their permeability (Letavet A.A., 1965).

Barrier function of the mucous membrane, salivary lysozyme titer and accumulation of bacteria in the oral cavity. A decrease in the phagocytic activity of leukocytes and the adsorption capacity of epithelial cells, compared to the control, was detected in 276 zinc production workers, which led to an exacerbation of catarrhal gingivitis and periodontitis (Tikhonova V.N., 1975). Alifbaeva S.A. (1990) revealed a high degree of damage to periodontal tissue among workers at a copper smelter – from 5% to 78.8% of cases.

The frequency of periodontal damage was directly dependent on the severity of occupational intoxication (Gitina L.I., 1970; Strazdina T.V., 1975). In the most

harmful workshops, bleeding gums, looseness, hyperemia, swelling were detected, and a large amount of dental plaque was noted. Lead, magnesium, copper, iron, phosphorus and aluminum were found in large quantities in tartar. According to Egorov F.F. (1972), Rodina B.I. (1977) among working riveters systematically exposed to noise and vibration, periodontal disease was detected in almost 100% of those examined.

Pakhomov (1982), A.P. Grokholsky and T.N. Faizullaev (1982), Wand Su Wen et al., (1986) revealed the dependence of the course of physiological and pathological processes in teeth and periodontal tissues on the concentration of microelements in tartar, hard tissues of teeth, saliva, blood, urine. According to the authors, the high content of copper, zinc, manganese influenced dental tissues, changing their structure and chemical composition, affected dental plaque, influenced the properties and chemical composition of saliva and oral microflora, changed the properties of saliva and dental tissues (Kodola N. L., Kononovich E.V., 1978).

A significant accumulation of silicon was found in the dental stones of glass production workers (Aizenstein, 1971).

An analysis of domestic and foreign literature on the issue under discussion has shown that the study of compensatory and adaptive processes in the oral cavity in workers exposed to metals contained in polymetallic dust before and during the process of adaptation to dentures remains not fully disclosed and relevant.

The work of many authors is devoted to the study of adaptation processes to various designs of dentures. The need for prosthetics of dentition defects with removable dentures in patients after 50 years of age reaches 56%; at a younger age (40–50 years), removable dentures are also used quite often (from 15 to 20%) [48, 78]. Orthopedic dental treatment is not only a local intervention, but also affects the body as a whole. At the same time, one of the main problems that attracts the attention of the authors is the patient's adaptation to the orthopedic design [36, 39, 100, 163, 174]

When using removable dentures, inflammatory disorders often occur, leading to persistent morphological and functional disorders of the tissues of the prosthetic bed [9, 154]. Age-related changes in the oral mucosa disrupt microcirculation like arteriosclerosis. The use of removable plate prostheses against this background contributes to pronounced hemodynamic disturbances, an increase in the phenomena of tissue hypoxia and, as a consequence, the development of chronic inflammation, depending on the type of structures and the duration of use of the prostheses [88].

With age, the regenerative ability of the epithelium decreases, the severity of signs of a chronic inflammatory process increases [111], a gradual suppression of immunological reactivity is observed: the phagocytic and secretory activity of tissue macrophages, the titer of salivary lysozyme, the functional activity of T-, B-lymphocytes decrease, and a deficiency occurs. Production of immunoglobulins [13, 44]. In this regard, a promising and relevant direction is the search for new highly effective drugs that, along with high therapeutic activity, have

With a minimum of side effects, which is especially important for elderly patients. Today, there are preparations based on titanium glycerosolvate (trademark «Tizol®»), which are an effective means of drug therapy for the oral mucosa and widely

Used in dentistry for the treatment of periodontal diseases [123]. However, these drugs are not used in clinical practice for the orthopedic treatment of elderly patients with removable plate prostheses. To increase the effectiveness of the effect of these drugs on the oral mucosa of elderly patients, their combination with biologically active magnesium-containing medicinal substances of natural origin is possible [98, 140, 141]. For example, S.A. Zufarov (1982) highlights: neuroreceptor adaptation of various types of sensitivity (tactile, pain, taste, etc.);

Phonetic adaptation; morpho-functional adaptation of prosthetic bed tissues; adaptation of the oral environment. The process of adaptation of organs and tissues of the oral cavity to new operating conditions includes changes in the hemodynamics of the periodontium of remaining teeth, immune status, morphological picture of periodontal tissues, etc. The development of reactions of the prosthetic bed is based on various pathogenetic mechanisms, the nature of which is determined by the characteristics of the stimuli emanating from the design of the prosthesis.

The development of reactions of the prosthetic bed is based on various pathogenetic mechanisms, the nature of which is determined by the characteristics of the stimuli emanating from the design of the prosthesis. The intensity, nature, duration and field of their influence depend on the design features of the prosthesis, the quality of technical manufacturing and the properties of the material (Gavrilov E.I., 1973; Zufarov S.A., Rutkovsky K.V..1982, Irsaliev Kh.I.. 1993, Safarov T.Kh. 1997, Aripova G.E., 1998). The following types of action of the bases of removable laminar dentures are distinguished: traumatic, allergic, toxic, side. The main causes of focal inflammation of the mucous membrane.

Lipid peroxidation also increases 1.7 times relative to the control group of patients with intact dentition. It has been established that with an increase in the number of metal inclusions from 1 to 10 there was a commensurate increase in the accumulation of malondialdehyde in spontaneous and inducible lipid peroxidation systems.

Studies conducted by S.E. Alimov (1986) showed that in the process of adaptation to partial and complete dentures in the first days of use, the pH of saliva significantly increases, and in the examined individuals with bridges it decreases slightly. Its restoration to normal levels occurs more slowly in persons using complete removable dentures.

An increase in the pH level of saliva occurs due to increased secretion of relatively alkaline saliva, while the acidic environment at the beginning of the

process of adaptation to metal dentures is mainly determined by the material of the denture and the activation of the inflammatory process, as well as quantitative and qualitative changes in the microflora of the oral cavity.

Using the electrophoresis method, Z.S. Yesenova (1976), when studying metal inclusions in the oral cavity for the protein composition of saliva, found that contact of the metal with saliva initially does not change, and then causes some deviations in the protein spectrum, consisting in a decrease in the number of individual protein bands . The reaction of the oral environment depended on the general condition of the body.

Thus, an analysis of the data available in the literature indicates that the frequency of side effects of orthopedic prosthetic designs is not decreasing. A dental prosthesis, no matter how perfect its design, is a foreign body for the body as a whole and for the tissues of the oral cavity in particular and has a certain side effect on its clinical, functional and morphological state (Gavrilov E.I., Zhulev, 2001). At the Department of Orthopedic Dentistry with Orthodontics, scientific research is carried out to develop measures for the prevention and treatment of side effects of dental prostheses of various designs on the fabric of the prosthetic bed (S.S. Agzamkhodzhaev, E.Ya. Balich, 1994; M.T. Safarov, 1997; Irsaliev Kh.I., 2001). Considering the high percentage of people working in hazardous industrial enterprises who need dental prosthetics, it seems necessary to study the effect of dentures on the condition of oral tissues and the course of the adaptation period to dentures in this category of patients.

All living organisms contain chemical elements of D.I. Mendeleev's periodic system. The indispensability of a number of microelements is known, but very little or nothing is known about the biological role of many elements, especially those present in ultra microconcentrations. A number of researchers classify such elements as "ballast", denying any biological role for them other than their toxicity (mercury, lead, etc.).

Despite significant gaps in modern ideas about the content and behavior of chemical elements in living organisms, this area of knowledge, in particular in connection with the problems of increasing anthropogenic pollution of the natural environment, deservedly attracts increasing attention from researchers. To date, a huge but poorly systematized experimental material has been accumulated and, although even today relatively little is known about the biological role of many chemical elements, the results of research in this area are becoming increasingly widely used in practice. The human body, like any other living organism, contains all the exceptions of chemical elements and all of them, presumably, play a certain biological role and take part in metabolic processes. Currently, less than half of the chemical content in human organs and tissues has been more or less reliably established.

Elements. Even such incomplete information allows us to draw certain conclusions. As a result of environmental influences (xenobiotics, radionuclides, radiation, etc.), an adaptive response of the human body develops. Numerous works by D.S. are devoted to the study of adaptation patterns. Sarkisova. (1982), A.Ado (1984), S.A. Zufarova (1976).

The adaptation process consists of a stage of functional tension, a stage of development of the morphological foundations of complexation and stabilization of the process (S.A. Zufarov, 1982; 1994). However, the noted pattern has been studied mainly with acute or single exposure or with repeated exposure to a pathogenic factor. Studies of the adaptation process under long-term exposure to microelements on the body are rare. Despite this methodological difficulty, a large number of studies have been conducted to study the adaptation process in connection with the elemental status of the organism in its physiological state and various pathologies.

Let us consider this problem by subgroups of the periodic system in connection with the physiological need and the problem of their participation in the adaptation process under study. The bulk of sodium in the body is found primarily

in tissue fluids. Sodium plays an important role in water metabolism, in neutralizing acidic products of intermediary metabolism, reduces the excitability of the neuromuscular system, maintains the excitability of the neuromuscular system, and maintains osmotic balance (Tur A.F.).

Potassium ions, which are a sodium antagonist, also play an equally important role in these physiological processes. If sodium reduces neuromuscular excitability, then potassium increases it. Alkaline earth elements, determining water hardness, are associated with the incidence of cardiovascular diseases.

The biological role of selenium is associated with its antioxidant property and numerous works are devoted to the therapeutic effect of selenium upon activation of free radical oxidation in toxic hepatitis (N. M. Kholmukhamedova, 1995; A. I. Nikolaev et al., 1995), At the same time, about the toxic effect experimental data were obtained for selenium (Tutelyan V.A. et al. 1995).

According to Zhuk L.I., Osinskaya N.S. (1988) found a high selenium content in people working in the workshops of the Almalyk Mining and Metallurgical Plant and, as a consequence of the impact, an increase in the incidence of dental diseases. Selenium is able to counteract the toxic effects of heavy metals. Its deficiency leads to myocardial dystrophy, an increase in heart size, and increases the likelihood of developing a heart attack.

Little is known about the biological role of yttrium, scandium, rare earth elements and lanthanides, although there are indications of the participation of scandium in the pathogenesis of diabetes. The importance of these elements, as well as uranium, is growing due to their participation as initiators of free radical oxidation, due to their uncontrolled entry into the biosphere with phosphorus fertilizers.

Chromium is directly involved in metabolism as a pro-oxidant element, affects the processes of hematopoiesis and the activity of the pancreas, enhances the action of insulin, and its excess amount causes general toxic, nephrotoxic and hematotoxic effects.

The extremely important role of iron, which is part of hemoglobin, in the transfer of oxygen and in the process of hematopoiesis is known. However, being an element of variable valency, iron is involved in the activation of lipid peroxidation processes, and at the same time is a minor component of the antioxidant defense system (Vladimirov Yu.A. et al., 1987).

Insufficient absorption of iron leads to the development of an imbalance in hematopoiesis and leads to anemia. The role of iron in adaptation processes after prosthetics is highlighted in the works of Agzamkhodzhaev S.S. (1998).

The author found that when restoring small and medium dentition defects with fixed iron prostheses, there is no effect on the intensity of lipid peroxidation in saliva during the process of adaptation to wearing dentures.

In the designs of dentures replacing large defects containing more than 6 metal units, activation of lipid peroxidation was detected, as a result of which the author proposes the use of antioxidant corrective therapy. Consequently, metals with variable valency are capable of initiating free radical oxidation and perform a pro-oxidant function in the body. The role of these elements in the process of adaptation of the body to certain environmental influences has not been definitively established.

Cobalt is also a pro-oxidant element. It is part of vitamin B12 and is associated with hematopoietic processes. Copper is a trace element that is part of ceruloplasmin, a protein that performs an antioxidant function in the body's plasma. It affects the activity of many enzymes, sex hormones, pituitary and thyroid hormones, and has anti-inflammatory properties.

The silver content varies under different physiological conditions, although its bacteriostatic role has long been known. Gold, like silver, is widely used in dentistry, however, a very small number of studies are known about their biological role in the normal oral cavity after prosthetics.

Zinc affects the function of the gonads, pancreas, and the process of hematopoiesis. Zinc, like selenium, is a minor microelement with an antioxidant

effect. In a number of pathological conditions and in the dynamics of corrective therapy for diseases accompanied by activation of lipid peroxidation, the positive effect of zinc preparations was attributed.

At the same time, the state of free radical oxidation in people working in hazardous industrial conditions with a high content of zinc in the atmosphere, drinking water, the level of lipid peroxidation and the state of the antioxidant system have been practically not studied.

A quick list of some data on the biological role of chemical elements in the human body does not exhaust the diversity of the problem, but explains the exceptional interest in it. Already today, the content of a number of elements in human biosubstrates is a recognized diagnostic sign of a number of diseases. Changes in the elemental composition of biosubstrates in various physiological disorders or diseases determine the desire of researchers to move on to correcting the elemental composition of biosubstrates as a therapeutic agent.

Of particular importance is the study of the elemental composition of human biosubstrates from the point of view of the adverse effects of a number of elements in the event of an abnormal deficiency or excess of their intake into the body. This can occur in both natural and anthropogenic anomalous biogeochemical regions and provinces. Special meaning

This kind of research is acquiring in our time, when the biogeochemical situation changes in some cases extremely sharply and has an adverse effect on human health.

Obviously, the search for substrates that most adequately reflect changes in the status of the human body should be considered very relevant. One of the human substrates that reflects the elemental status of the body is oral fluid.

Thus, an analysis of the literature on the biological role of microelements in normal conditions and during the development of adaptation processes in the human body indicates the existence of different groups of microelements with opposite effects on the functional state of the cell. The question of the biological

role of microelements in the process of adaptation to wearing dentures is presented in isolated works. Apparently, the role of microelements in the conditions of people staying in an ecologically unfavorable region increases greatly; their concentration and the significance of research in this direction are of undoubted practical importance.

The main link regulating the functional processes of tissues, the functioning of physiological and various pathological processes in the human body is the structural and functional state of the membrane components of the cell. Numerous studies (Burlakova E.B. et al. 1986) have shown that one of the factors limiting the structural organization of cell membranes in the body is the state of antioxidant defense mechanisms.

Dentures, being an element of a constant physical irritant, do not fully replace natural integral structures, lead to the development of secondary pathological changes in the oral cavity as a consequence of secondary trophic genesis associated with violation of the structural organization of cell membranes in the mucous membrane of the oral cavity and its appendages (Khabibulaeva N.A., 1993). As already mentioned, removable laminar dentures change the functional state and morphological structure of the underlying mucous membrane.

Activation of the process of lipid peroxidation plays an important role in the development and course of a number of pathological processes (Burlakova E.B., 1995). In the process of lipid peroxidation, a change occurs in the composition of biological cell membranes; the resulting toxic products cause inactivation of enzymes, damage the structure of proteins and nucleic acids, thereby affecting the functional activity of the body as a whole.

It is known that the antioxidant system consists of several components: bioantioxidants – tocopherol, steroid hormones, ubiquinone, carotene, vitamins C, PP, flavonoids and other compounds that are part of biomembranes and cells in their minor components; trace elements – zinc, selenium, copper, magnesium. Antioxidant enzymes that destroy and inactivate the final and intermediate

products of free radical oxidation: catalase, glutathione peroxidase, glutathione reductase, superoxide dismutase. Some components of membranes, cells and biological media of the body have antioxidant properties and inhibit free radical oxidation reactions at the branching stage chains: phosphotidylcholine (lecithin), which makes up the bulk of membrane phospholipids, ceruloplasmin – a blood protein. Currently, research into the properties of synthetic antioxidants, which, based on solubility, are divided into two groups: water-soluble and fat-soluble, has also found widespread use.

Free radical oxidation plays an important role in normal cell physiology and often acts as a key link in the pathogenesis of many diseases. Free radical oxidation of lipids continuously occurs normally in all tissues of living organisms, but the reaction rate is very low and has a stationary level (Ibragimov U.K., 1991; Komilov Kh.P., 1993).

Free radical oxidation of lipids is one of the natural pathways of lipid metabolism, a process that constantly occurs in the cell. For example, the regulation of DNA synthesis, membrane permeability, and mitochondrial functioning is associated with the process of SROL and unsaturated fatty acids of membrane phospholipids in animal cells (E.B. Burlakova, 1995).

In the process of SROL, reactive metabolites are formed that have cytostatic and cytotoxic effects. It has been established that SROL products are normally involved in the regulation of the growth rate of the body (Zhuravlev A.I., 1986), in the regulation of membrane permeability (Vladimirov Yu.A. et al., 1976) and cell proliferation (Burlakova E.B., 1995) .

The mechanism of activation of free radical oxidation of lipids lies in the imbalance in the intensity of free radical reactions occurring in the cells and tissues of the body, the potential capabilities of the integral antioxidant system. A sharp activation of SROL was observed under the influence of X-rays, ultraviolet rays, radiation, radionuclides (Tarusov B.N., 1978; Zhuravlev A.I., 1982; Burlakova E.B. et al., 1975, 1982).

The chain mechanism of reaction development leads to an avalanche-like growth of intermediates, against the background of increased consumption of tissue antioxidants. If the amount of exogenous antioxidants supplied with food and the cellular pool of antioxidants are insufficient, then signs of the syndrome of “exogenous secondary antioxidant deficiency” (Ibragimov U.K., 1991). Activation of SROL is also possible in case of insufficiency of regulatory AOC as a result of a decrease in the intake of natural antioxidants (AO) into the body, for example, with vitamin deficiency E. This state of AOC in the body can be designated as primary deficiency.

At the same time, changes were observed in the phospholipid spectrum of membranes towards an increase in lysoforms, disruption of the functioning of enzyme systems of mitochondrial and microsomal oxidation, the cascade mechanism of the adenylate cyclase system, and signal transmission into the cell

Secondary antioxidant deficiency - “antioxidant starvation” (Ibragimov U.K., 1991) develops in diseases of the gastrointestinal tract of infectious etiology, in pathology of the hepatobiliary system (Khidoyatov B.A. et al., 1983) and other listed pathologies are characterized by normal the content of exogenous AO in food reduces the absorption of fat-soluble vitamins.

Changes in AOA associated with increased consumption of antioxidants and increased SROL cause changes in the physicochemical properties of membranes and the activity of membrane-bound enzymes, which affects DNA synthesis and cell division. A decrease in the amount of antioxidants and an increase in SROL leads to inhibition of cell division.

An increase in the content of antioxidants and a decrease in the concentration of SROL metabolites leads to an increase in the mitotic activity of tissues. The change in the antioxidant activity of lipids coincides with the phases of mitosis, the maximum of DNA synthesis corresponds to the maximum AOA of nuclear lipids (Palmina N.P. et al., 1975). Currently, 5 main mechanisms of action

of antioxidants on cellular metabolism and peroxidation processes have been established:

-interaction with free radicals, -interaction with receptors ("self" and "foreign"), -effect on enzyme activity (interaction with catalytic and allosteric centers), -incorporation into membranes, accompanied by their structural and functional changes, -interaction with the genetic apparatus of the cell.

One of the effects of antioxidants on cellular metabolism is their effect on the genome. According to many authors, antioxidants bind to the DNA molecule, which leads to a change in the activity of the DNA matrix (Burlakova E.B., 1997). Antioxidants, interacting with free radicals, reduce the exit from membranes, thereby changing their structure. Lipids play the role of effectors of membrane proteins, influencing their enzymatic activity, substrate specificity, confirmation changes, sensitivity to external agents (regulators), etc. Therefore, antioxidants, by changing the structure of the membrane, actively influence its enzymatic properties.

The sensitivity of enzymes to the action of antioxidants may be due to the dependence of their activity on the intensity of lipid peroxidation (Ibragimov U.K., 1995). Antioxidants stimulate cell metabolism and metabolism in general in various ways, which together cause a complex of sequential changes realized at multiple structural levels. The initial and main effect of antioxidants is to neutralize free radicals. This interaction is effective at high rate constants for this reaction. A decrease in the concentration of free radicals leads to a decrease in membrane damage.

The incorporation of antioxidant molecules into the membrane, which is possible due to the hydrophobic properties and structural similarity of natural and synthetic antioxidants, also leads to a change in the functional properties of the membrane. The choice of any antioxidant for this purpose may depend on its antiradical activity.

The wide range of biological effects of antioxidants makes it possible to use them not only to correct pathological processes, but also to influence metabolism under normal conditions. Pathological conditions, maintaining free radical reactions at a high level for a long time, contribute to the intensification of lipid peroxidation. Therefore, the introduction of antioxidants into the body is necessary to compensate for the processes of free radical oxidation of lipids and to correlate changes in the structural and functional properties of membranes caused by the intensification of lipid peroxidation.

In most studies on the intensity of lipid peroxidation in dental diseases, its activation is noted, and the authors recommend corrective AO therapy (Yakubov R.K., 1993; Azimov M.I. et al. 1995; Kurbanov Sh.Sh., 1996; Agzamkhodzhaev S.S., 1997).

However, for people living in industrial areas, the body receives an excess amount of elements, including antioxidants. Yunusova R.T. (1998) found in the body of children living in an ecologically unfavorable area an increased content of antioxidant elements: selenium, zinc. As a result of their action, the author notes the development of functional liver damage in children. In the work of V.A. Tutelyan (1995) showed the toxic effect of the antioxidant selenium on the functional state of monooxygenase liver systems of normal animals. The author notes a decrease in the activity of enzymes involved in the detoxification of xenobiotics. Research conducted by A.A. Sedunov, S.M. Pleshkova, E.Ya. Rakhmanova (1990) showed that dentures made of steel and plastic cause disruption of the lipids of the membrane structures of the oral cavity, which in turn leads to an increase in the content of malondialdehyde in saliva - a product of lipid peroxidation.

This violation manifests itself both in the presence of occupational hazards and in their absence. Accordingly, catalase activity decreases and SOD decreases in these groups. A decrease in catalase was considered as a link in the violation of

antioxidant protection, and an increase in SOD was a protective-compensatory direction to prevent further violation of FRO.

Thus, summarizing the literature data, we can state that significant information material has been accumulated, reflecting the various properties of saliva and the nature of its changes in various diseases of the oral cavity, including dental prosthetics. However, in modern literature there is practically no data on the functional characteristics of saliva, reflecting the state of the structural and functional organizations of cell membranes - lipid peroxidation processes and antioxidant functions at the level of the oral cavity during adaptation to dentures in workers at industrial enterprises with a high content of microelements - antioxidants

Clinical studies of persons employed in metallurgical production This work is based on the results of a survey of workers at the Almalyk Mining and Metallurgical Combine Copper Smelter (MPS). The control group consisted of patients who went to the orthopedic dentistry clinic of the Tashkent Dental Institute clinic.

Conventionally, the control group consisted of workers from auxiliary workshops and business units of the TTZ, who were not in contact with chemical industrial hazards, and there was no polymetallic dust in the air environment. A total of 130 people were examined, aged 20-65 years. Data on gender and age composition are presented in Table 1.

Table 1. Data on the sex and age composition of the examined patients.

Age	20-30		31-40		41-50		51 and older		Total	
gender	M	F	M	F	M	F	M	F	M	F
Groups of surveyed										
Workers	7	3	7	3	2	5	o'n bir	9	27	20

Students and employees of Tashkent	16	5	3	-	3	3	1	2	23	10
Workers of TTZ	12	4	7	3	10	3	8	3	37	13
Total	35	12	17	6	15	o'n bir	20	14	87	43

Table 2. Work experience of the surveyed workers at MPZ, TTZ

Work experience corporation	<5 y	5-10 y	>11 y	Total
MPZ	11	9	27	47
TTZ	20	18	o'n bir	49

By age, the subjects were divided into 4 groups: 20-30 years old, 31- 40 years old, 41-50, 51 and older. As can be seen from Table 1, the majority of the MPP workers surveyed were aged 51 or older. When distributed according to work experience, the examined MPH patients were divided into 3 groups: the first group with up to 5 years of experience, the second - from 5 to 10 years, the third - from 11 years and above. The main contingent of AGMK workers who seek orthopedic dental care are workers with more than 11 years of experience and above.

### 1. Clinical and functional studies

Clinical studies were carried out using a pre-compiled questionnaire; they began with identifying complaints about the condition of the oral cavity. Establishing the presence of unpleasant sensations, bad breath, pain, burning of the mucous membrane, itching, bleeding gums, impaired salivation, taste,

tooth mobility and others. When collecting anamnesis, we found out the causes and duration of tooth loss.

An objective dental examination began with an examination of the red border of the lips, then examined the mucous membrane of the lips, cheeks, soft and hard palate, floor of the mouth, gums, and tongue. Special attention focused on studying the condition of the mucous membrane of the prosthetic bed, its bone base, the degree and type of atrophy of the alveolar processes. At the same time, attention was paid to color, moisture, swelling, pliability, the presence of erosions, ulcerations of leukokeratosis foci and other pathological changes. During the examination, the degree of damage to the teeth and dentition was also determined.

The assessment of existing dentures was carried out as follows: fixed dentures were considered satisfactory if single artificial crowns did not injure the gums, i.e. had minimal immersion in the gum pocket, tightly covered the necks of the teeth, had contact with adjacent and opposing teeth, did not overstate the bite, and the cusps and cutting edges of the crowns did not interfere with the closure and lateral movements of the lower jaw.

Bridges were considered satisfactory if the supporting part met the requirements for artificial crowns, made taking into account the functional usefulness of the periodontium of the supporting teeth and antagonist teeth and in compliance with the requirements for the intermediate part. The latter should not overestimate the bite, come into contact with antagonist teeth, and not interfere with the movement of the lower jaw, provided that the rinsing system in the area of the lateral teeth and the tangent in the area of the front teeth are followed, without traumatizing the mucous membrane.

An analysis of the condition of fixed dentures showed (82% of workers from the total number of those examined) that 54% of the workers from this number of those examined had them in unsatisfactory condition.

A number of requirements were imposed on removable dentures: the boundaries of the denture bases must correspond to the prosthetic bed and the boundaries of the valve zone, the base itself must be adjacent to the mucous membrane of the prosthetic bed and not balance, the denture should not overestimate or underestimate the bite.

In the presence of a partially removable denture, attention was paid to the location of the existing clasps. They should not injure the mucous membrane of the gums, lips, cheeks, and cover the tooth well, while taking into account the correct choice of a natural tooth for the clasp. In addition, artificial teeth with a complete removable denture and the presence of a partial denture must have maximum contact and not interfere with the movement of the lower jaw. Under high-magnification magnification, structural defects of plastic products were determined, such as pores, veins, and heterogeneity of the material, which is of great importance in the processes of adaptation to dentures.

For dental examination, an operating microscope, model 178, with an object magnification of 4,6,10,16 and 25 times was used. The examination was carried out in natural light and began with an examination of the red border of the lips, taking into account the color, the presence of inflammatory processes, plaque, cracks, and peeling. Then the mucous membrane of the lower and upper lip, right and left cheek, soft and hard palate, alveolar processes of the upper and lower jaw, teeth and dentures, transitional folds, tongue and its papillae were examined. When examining the oral mucosa, attention was paid to the degree of translucency of the underlying vessels, their density, caliber, number of connective tissue papillae, uniformity of color, and the presence of keratosis.

To study the process of adaptation of the tissues of the prosthetic bed to dentures, stomatoscopic studies were carried out before the delivery of

dentures and in the dynamics of use. The studies were conducted on days 7, 14, 21, and 28 of using dentures.

Dental examination began with clarification of complaints and life history. At the same time, they found out living conditions, bad habits, and anamnesis of previous diseases. Among bad habits, smoking, drinking alcohol, and chewing tobacco played a significant role.

The presence of unpleasant sensations, pain, burning of the tongue, metallic taste in the mouth, etc. were determined. Particular importance was attached to studying the nature, localization, and intensity of pathological subjective sensations in the oral cavity in connection with the use of various designs of dentures by patients.

We studied the duration and dynamics of the appearance of complaints, their connection with production environmental conditions.

In patients using dentures, we found out the beginning and duration of using dentures, design features, materials from which the dentures were made, the duration of getting used to them, and assessed the quality and suitability of the dentures.

To objectively assess the condition of marginal periodontal tissues, periodontal indices were used.

1. PMA modified by Parma (T.F. Vinogradova, 1987). The degree of gum inflammation was determined using the PMA (papillary-marginal-alveolar) gingivitis index. Inflammation of the papilla (P) was assessed as 1 point, inflammation of the gingival margin (M) - 2 points, and inflammation of the alveolar gum (A) - 3 points.
2. Functional test of Schiller - Pisarev (1963).

After hygienic treatment of the oral cavity, the gums are stained with a solution

Jodi puri cristalisati - 1.0

Kalii jodati pulu - 2.0

Agua destill - 40.0

The symptom of gingivitis and the prevalence of the inflammatory process were identified.

### 3. Hygienic index of Fedorov-Volodkina (1971).

The vestibular surface of the teeth is lubricated with Schiller-Pisarev solution

321	123
-----	-----

The assessment is made according to a 5-point system. No staining - 1 point.

1/4 crown colouring - 2 points Colouring 1/2 crown - 3 points Colouring 3/4

crowns - 4 points Colouring of the entire crown 5 points

The calculation was carried out according to the formula:

$S_k$

$S_k$

$K\phi = \frac{S_k}{N}$ , where,  $K_f$  - average hygienic index  $n$

$K$  - hygiene of index 1 tooth  $S$  - sum of indicators

$N$  - number of teeth

The type of bite was determined. The surveyed in the diagnosis of partial tooth loss used the Kennedy classification. The degree of atrophy of alveolar processes of toothless jaws was assessed according to the classification of Schroeder and Keller.

All patients after the dental examination received appropriate recommendations for the prevention and treatment of dental disease. 92 of them received orthopaedic dental care, 27 examined patients were removed non-removable bridges due to their unsuitability for further use. 39 patients were made removable plate prostheses. 53 patients were made non-removable metal prostheses.

## 2. Biochemical studies of mixed saliva

The examinees' saliva was usually collected from 9 a.m. to 1 p.m. Before collecting saliva, patients thoroughly rinsed their mouths with warm water. Mixed saliva was collected in clean test tubes.

### A. Chemoluminescent analysis of mixed saliva

The intensity of chemiluminescence was determined on the HLMC-0.1 chemiluminometer using the method of Yu.A. Vladimirova and A.I. Archakov (1972). 1.0 ml of saliva was placed in a temperature-static cuvette at 37° C, the light sum was recorded for 10 seconds with a closed curtain (dark current) and the ultra-weak glow was recorded with an open curtain. The dark current level was significantly different from the intensity of the ultra-weak glow.

### B. Determination of the content of malon dialdehyde in saliva. The content of malon dialdehyde was determined by the method,

Described by N.D. Stalnaya and T.G. Garishvili (1977). The method is based on the interaction of 2-thiobarbituric acid with lipid peroxidation products - MDA at high temperature in an acidic environment with the formation of a trimetin complex with a maximum absorption in the red region of the visible spectrum at 532 nm. Molar extinction coefficient -  $1.56 \times 10^4 \text{ cm} \times \text{M}$ . To determine the spontaneous POL, the incubation mixture consisted of 0.2 ml of serum and 0.8 ml tris - HCl buffer (pH=7.4), which was thermostatic at 37 C for 30 minutes. The level of spontaneous POL was expressed in nmol/mg protein x 30 min.

### C Determination of the content of hydroperoxides in saliva.

The content of hydroperoxides in mixed saliva was determined by the method of V.V. Gavrilov and S.I. Mishkorudnaya (1983). The method is based on intensive absorption of hydroperoxes in the 232 nm region. Registration of hydroperoxes was carried out on the SF-26 spectrophotometer. The calculation of the content of hydroperoxides was carried out in relative units per ml of mixed saliva and per mg of lipids.

### City Determination of total lipids.

The content of total lipids in mixed saliva was carried out using the biotest "La Chema" (Czech Republic), according to the instructions attached to the kit. The principle of this method is based on the interaction of total lipids after hydrolysis with sulphuric acid with a phosphovanil reagent to form red staining.

The optical density of the samples (A) and the standard (B) was measured at a wavelength of 530 nm, and the calculation was carried out according to the formula.

$$X = 8 \times A/B ,$$

Where, X - total saliva lipids in g/l D. Determination of the total protein.

The total protein content in mixed saliva was carried out using the Lowry O.H. et al method. (1951). B.S.A. was used for the calibration curve.

E. Determination of antiperoxide activity of saliva.

The determination of the antiperoxide activity of mixed saliva was carried out according to the method of U.K. Ibragimov and co-authors (1993). The principle of the method is based on the ability of antioxidant enzymes of saliva to break down hydrogen peroxide during incubation at 37°C for 30 minutes. The control sample contained similar components with concentrated sulphuric acid to inactivate enzymes. Antiperoxide activity of saliva was calculated taking into account the consumption of 0.1n of the KMP04 solution, which went to titrate the control sample (saliva, to which sulphuric acid was added before incubation)

### **3. Radioactive analysis of the microelement composition of saliva.**

Instrumental neutron activation analysis allows you to determine more than 30 elements in one saliva sample. At the same time, multiple irradiation and long-term measurement of induced activity are necessary to establish their content. Different time modes of analysis (irradiation, cooling, measurement) were used to determine the content of elements from their radionuclides with different half-lives. We have selected the optimal attachment and time modes to determine the

maximum possible number of elements with a given accuracy and high performance.

The method of instrumental neutron-activation determination of the content in saliva was as follows: Saliva samples packed together with the standards in a polyethylene container were irradiated in the vertical channel of the VVRSM reactor with a neutron flux  $n.10^{13}$  p/cm<sup>2</sup> sec for 15 seconds. Measurement of induced activity was carried out twice - 10 minutes after irradiation to determine the content of manganese, after 2 hours to determine the content of sodium and copper.

To determine the content of Ca, Br, Au, the same samples were wrapped in aluminum foil and irradiated in the wet channel of the reactor with a neutron flux  $n. 10^{13}$  p/cm<sup>2</sup> for 15 hours. Measurement of induced activity was carried out a week after irradiation on the formed radionuclides.

To determine the content of Sc, Cr, Fe, Co, Zn, Se, Ag, Sb, irradiated 15 hours of samples were measured a month after irradiation by the formed radionuclides.

All measurements were carried out on a Ge (Li) detector with a resolution of 3.5 keV on the line 1332 60-Co, connected to a multi-channel analyser.

Various standards were used to calculate the quantitative content of elements in saliva samples: inside laboratory standards prepared by applying a known amount of element to desalic filter paper and IAEA standard comparison samples H-4 (Aninnal blood) and NN-1.

The calculation of the quantitative content of the elements was carried out according to the formula:

$J, ar. M et.$

$X= Mg/g, J - M ar.$

Where, X is the content of the element in the sample,

J abr., Jet. - t number of pulses in a photopeak of the element being determined in the sample and standard,

M et. - the content of the element in the standard,

M obr. - the mass of the sample.

Nuclear-physical Characteristics Defined Radionuclides are shown in Table 3. Thus, the content of 24 elements in saliva was determined by the instrumental neutron activation method. Neutron activation analysis method, like any other method,

Not free from random And systematic errors, the main sources of which are:

- Procedure for preparing samples for analysis,
- Benchmarking,
- Errors in measuring radionuclide activity, etc.

Identification and assessment of the level of errors in determining the elements of the methodology used is achieved with the help of a comparison sample. We selected a standard sample of IAEA comparison NN-1 with the certified content of elements, with the help of which the correctness and reproducibility were determined - the main analytical parameters of the method.

Table 3

Nuclear-physical characteristics of the defined elements and parameters of the developed methods

## **2. Clinical and functional studies**

Clinical studies were carried out using a pre-compiled questionnaire; they began with identifying complaints about the condition of the oral cavity. Establishing the presence of unpleasant sensations, bad breath, pain, burning of the mucous membrane, itching, bleeding gums, impaired salivation, taste, tooth mobility and others. When collecting anamnesis, we found out the causes and duration of tooth loss.

An objective dental examination began with an examination of the red border of the lips, then examined the mucous membrane of the lips, cheeks, soft and hard palate, floor of the mouth, gums, and tongue. Special attention

focused on studying the condition of the mucous membrane of the prosthetic bed, its bone base, the degree and type of atrophy of the alveolar processes. At the same time, attention was paid to color, moisture, swelling, pliability, the presence of erosions, ulcerations of leukokeratosis foci and other pathological changes. During the examination, the degree of damage to the teeth and dentition was also determined.

The assessment of existing dentures was carried out as follows: fixed dentures were considered satisfactory if single artificial crowns did not injure the gums, i.e. had minimal immersion in the gum pocket, tightly covered the necks of the teeth, had contact with adjacent and opposing teeth, did not overstate the bite, and the cusps and cutting edges of the crowns did not interfere with the closure and lateral movements of the lower jaw.

Bridges were considered satisfactory if the supporting part met the requirements for artificial crowns, made taking into account the functional usefulness of the periodontium of the supporting teeth and antagonist teeth and in compliance with the requirements for the intermediate part. The latter should not overestimate the bite, come into contact with antagonist teeth, and not interfere with the movement of the lower jaw, provided that the rinsing system in the area of the lateral teeth and the tangent in the area of the front teeth are followed, without traumatizing the mucous membrane.

An analysis of the condition of fixed dentures showed (82% of workers from the total number of those examined) that 54% of the workers from this number of those examined had them in unsatisfactory condition.

A number of requirements were imposed on removable dentures: the boundaries of the denture bases must correspond to the prosthetic bed and the boundaries of the valve zone, the base itself must be adjacent to the mucous membrane of the prosthetic bed and not balance, the denture should not overestimate or underestimate the bite.

In the presence of a partially removable denture, attention was paid to the location of the existing clasps. They should not injure the mucous membrane of the gums, lips, cheeks, and cover the tooth well, while taking into account the correct choice of a natural tooth for the clasp. In addition, artificial teeth with a complete removable denture and the presence of a partial denture must have maximum contact and not interfere with the movement of the lower jaw. Under high-magnification magnification, structural defects of plastic products were determined, such as pores, veins, and heterogeneity of the material, which is of great importance in the processes of adaptation to dentures.

For dental examination, an operating microscope, model 178, with an object magnification of 4,6,10,16 and 25 times was used. The examination was carried out in natural light and began with an examination of the red border of the lips, taking into account the color, the presence of inflammatory processes, plaque, cracks, and peeling. Then the mucous membrane of the lower and upper lip, right and left cheek, soft and hard palate, alveolar processes of the upper and lower jaw, teeth and dentures, transitional folds, tongue and its papillae were examined. When examining the oral mucosa, attention was paid to the degree of translucency of the underlying vessels, their density, caliber, number of connective tissue papillae, uniformity of color, and the presence of keratosis.

To study the process of adaptation of the tissues of the prosthetic bed to dentures, stomatoscopic studies were carried out before the delivery of dentures and in the dynamics of use. The studies were conducted on days 7, 14, 21, and 28 of using dentures.

Dental examination began with clarification of complaints and life history. At the same time, they found out living conditions, bad habits, and

anamnesis of previous diseases. Among bad habits, smoking, drinking alcohol, and chewing tobacco played a significant role.

The presence of unpleasant sensations, pain, burning of the tongue, metallic taste in the mouth, etc. were determined. Particular importance was attached to studying the nature, localization, and intensity of pathological subjective sensations in the oral cavity in connection with the use of various designs of dentures by patients.

We studied the duration and dynamics of the appearance of complaints, their connection with production environmental conditions.

In patients using dentures, we found out the beginning and duration of using dentures, design features, materials from which the dentures were made, the duration of getting used to them, and assessed the quality and suitability of the dentures.

To objectively assess the condition of marginal periodontal tissues, periodontal indices were used.

3. PMA modified by Parma (T.F. Vinogradova, 1987). The degree of gum inflammation was determined using the PMA (papillary-marginal-alveolar) gingivitis index. Inflammation of the papilla (P) was assessed as 1 point, inflammation of the gingival margin (M) - 2 points, and inflammation of the alveolar gum (A) - 3 points.
4. Functional test of Schiller - Pisarev (1963).

After hygienic treatment of the oral cavity, the gums are stained with a solution

Jodi puri cristalisati - 1.0

Kalii jodati pulu - 2.0

Agua destill - 40.0

The symptom of gingivitis and the prevalence of the inflammatory process were identified.

### 3. Hygienic index of Fedorov-Volodkina (1971).

The vestibular surface of the teeth is lubricated with Schiller-Pisarev solution

321	123
-----	-----

The assessment is made according to a 5-point system. No staining - 1 point.  
1/4 crown colouring - 2 points Colouring 1/2 crown - 3 points Colouring 3/4  
crowns - 4 points Colouring of the entire crown 5 points

The calculation was carried out according to the formula:

Sk

$S_k$

$K\phi = \frac{S_k}{N}$ , where, Kf - average hygienic index n

K - hygiene of index 1 tooth S - sum of indicators

N - number of teeth

The type of bite was determined. The surveyed in the diagnosis of partial tooth loss used the Kennedy classification. The degree of atrophy of alveolar processes of toothless jaws was assessed according to the classification of Schroeder and Keller. All patients after the dental examination received appropriate recommendations for the prevention and treatment of dental disease. 92 of them received orthopaedic dental care, 27 examined patients were removed non-removable bridges due to their unsuitability for further use. 39 patients were made removable plate prostheses. 53 patients were made non-removable metal prostheses.

## 2. Biochemical studies of mixed saliva

The examinees' saliva was usually collected from 9 a.m. to 1 p.m. Before collecting saliva, patients thoroughly rinsed their mouths with warm water. Mixed saliva was collected in clean test tubes.

#### A. Chemoluminescent analysis of mixed saliva

The intensity of chemiluminescence was determined on the HLMC-0.1 chemiluminometer using the method of Yu.A. Vladimirova and A.I. Archakov (1972). 1.0 ml of saliva was placed in a temperature-static cuvette at 37° C, the light sum was recorded for 10 seconds with a closed curtain (dark current) and the ultra-weak glow was recorded with an open curtain. The dark current level was significantly different from the intensity of the ultra-weak glow.

#### B. Determination of the content of malon dialdehyde in saliva. The content of malon dialdehyde was determined by the method,

Described by N.D. Stalnaya and T.G. Garishvili (1977). The method is based on the interaction of 2-thiobarbituric acid with lipid peroxidation products - MDA at high temperature in an acidic environment with the formation of a trimetin complex with a maximum absorption in the red region of the visible spectrum at 532 nm. Molar extinction coefficient -  $1.56 \times 10^4 \text{ cm} \times \text{M}$ . To determine the spontaneous POL, the incubation mixture consisted of 0.2 ml of serum and 0.8 ml tris - HCl buffer (pH=7.4), which was thermostatic at 37 C for 30 minutes. The level of spontaneous POL was expressed in nmol/mg protein x 30 min.

#### C Determination of the content of hydroperoxides in saliva.

The content of hydroperoxides in mixed saliva was determined by the method of V.V. Gavrilov and S.I. Mishkorudnaya (1983). The method is based on intensive absorption of hydroperoxes in the 232 nm region. Registration of hydroperoxes was carried out on the SF-26 spectrophotometer. The calculation of the content of hydroperoxides was carried out in relative units per ml of mixed saliva and per mg of lipids.

#### City Determination of total lipids.

The content of total lipids in mixed saliva was carried out using the biotest "La Chema" (Czech Republic), according to the instructions attached to the kit. The principle of this method is based on the interaction of total lipids after hydrolysis with sulphuric acid with a phosphovanil reagent to form red staining.

The optical density of the samples (A) and the standard (B) was measured at a wavelength of 530 nm, and the calculation was carried out according to the formula.

$$X = 8 \times A/B ,$$

Where, X - total saliva lipids in g/l D. Determination of the total protein.

The total protein content in mixed saliva was carried out using the Lowry O.H. et al method. (1951). B.S.A. was used for the calibration curve.

E. Determination of antiperoxide activity of saliva.

The determination of the antiperoxide activity of mixed saliva was carried out according to the method of U.K. Ibragimov and co-authors (1993). The principle of the method is based on the ability of antioxidant enzymes of saliva to break down hydrogen peroxide during incubation at 37°C for 30 minutes. The control sample contained similar components with concentrated sulphuric acid to inactivate enzymes. Antiperoxide activity of saliva was calculated taking into account the consumption of 0.1n of the KMP04 solution, which went to titrate the control sample (saliva, to which sulphuric acid was added before incubation)

### **3. Radioactive analysis of the microelement composition of saliva.**

Instrumental neutron activation analysis allows you to determine more than 30 elements in one saliva sample. At the same time, multiple irradiation and long-term measurement of induced activity are necessary to establish their content. Different time modes of analysis (irradiation, cooling, measurement) were used to determine the content of elements from their radionuclides with different half-lives. We have selected the optimal attachment and time modes to determine the maximum possible number of elements with a given accuracy and high performance.

The method of instrumental neutron-activation determination of the content in saliva was as follows: Saliva samples packed together with the standards in a polyethylene container were irradiated in the vertical channel of the VVRSM reactor with a neutron flux  $n \cdot 10^{13}$  p/cm<sup>2</sup> sec for 15 seconds. Measurement of induced activity was carried out twice - 10 minutes after irradiation to determine the content of manganese, after 2 hours to determine the content of sodium and copper.

To determine the content of Ca, Br, Au, the same samples were wrapped in aluminum foil and irradiated in the wet channel of the reactor with a neutron flux  $n \cdot 10^{13}$  p/cm<sup>2</sup> for 15 hours. Measurement of induced activity was carried out a week after irradiation on the formed radionuclides.

To determine the content of Sc, Cr, Fe, Co, Zn, Se, Ag, Sb, irradiated 15 hours of samples were measured a month after irradiation by the formed radionuclides.

All measurements were carried out on a Ge (Li) detector with a resolution of 3.5 keV on the line 1332 60-Co, connected to a multi-channel analyser.

Various standards were used to calculate the quantitative content of elements in saliva samples: inside laboratory standards prepared by applying a known amount of element to desalic filter paper and IAEA standard comparison samples H-4 (Aninnal blood) and NN-1.

The calculation of the quantitative content of the elements was carried out according to the formula:

$J, ar. M et.$

$X = Mg/g, J - M ar.$

Where, X is the content of the element in the sample,

J abr., Jet. - t number of pulses in a photopeak of the element being determined in the sample and standard,

M et. - the content of the element in the standard,

M obr. - the mass of the sample.

Nuclear-physical Characteristics Defined Radionuclides are shown in Table 3. Thus, the content of 24 elements in saliva was determined by the instrumental neutron activation method. Neutron activation analysis method, like any other method,

Not free from random And systematic errors, the main sources of which are:

- Procedure for preparing samples for analysis,
- Benchmarking,
- Errors in measuring radionuclide activity, etc.

Identification and assessment of the level of errors in determining the elements of the methodology used is achieved with the help of a comparison sample. We selected a standard sample of IAEA comparison NN-1 with the certified content of elements, with the help of which the correctness and reproducibility were determined - the main analytical parameters of the method.

Table 3

Nuclear-physical characteristics of the defined elements and parameters of the developed methods

Elec op	radionu klid	Energy of gamma quanta,keV	Half raceperio d	Radiati on time.	Time has cooled down.	Measu remen t time. Sec	Limit determined by µg/g
Na	24-Na	1369	15 h	15 h	2 h	100	5
sc	46-v	889 , 1120	83,8 d	15 h	30 d	400	0,0001
Ca	47-Ca	160	3.43 d	15 h	7 d	400	25
Cr	51-Cr	320	27,2 d	15 h	30 d	400	0,05
Fe	59-Fe	10099.1292	44,5 d	15 h	30 d	400	1
Mn	56-Mn	847	2.58 h	15 h	10 m	100	0,05
co	60-Co	1173.1332	5,27 g	15 h	30 d	400	0,005
Cu	64-Ku	511	12,8 h	15 h	2 h	100	1
Zn	65-Zn	1115	244 d	15 h	30 d	400	5
Se	75-Se	265	120 d	15 h	30 d	400	0,05
Br	82-Br	777	1.47	15 h	7 d	200	0.1

Ag	110-Ag	658	250 d	15 h	30 d	400	0,05
Sb	124-Sb	1696	60,2 d	15 h	30 d	400	0,01
Au	198-Av	412	2,69 d	15 h	7 d	200	0,0001
K	40-K	1524	12,5 soat	15 h	7 d	200	50
Pb	86-Pb	1078	18,7 d	15 h	30 d	400	0,5

Total Error Definitions Elements Method INNA was evaluated on the basis of standard deviation calculations:

$$S = \sqrt{\frac{\sum (X_i - \bar{X})^2}{n - 1}}$$

Where S - standard deviation,

X - Average content,

X<sub>i</sub> - Content in the sample,

n - Number of parallel samples

The relative standard deviation was calculated by the formula:

$$Sr = \frac{S}{\bar{X}} \cdot 100 \%$$

The correctness of the analysis results was determined by comparing the obtained data with the data of the certified values of the standard sample, since the correctness of the analysis is a value equal to (C<sub>i</sub>-C<sub>o</sub>), which determines the degree of correspondence between the actual (certified) content of the element and its assessment obtained as a result of a series of measurements. The values of the correctness of the developed methodology are given in Table 4.

Table 4

Assessing the correctness of the analysis results  
(Reference sample for comparison HH-1 - hair homogenate), µg/g

Element	Assesment of the correctness of the analysis results	Found by us relative	Deviation
Ag	0,19 ± 0,06	0,21 ± 0,064	+10
Au	0,03 ± 0,01	0,026 ± 0,007	- 12
Br	4.16 ± 2.1	4,3 ± 0,54	+ 2.4
Ca	522 ± 160	540 ± 120	+ 3.6
Cl	2265 ± 71	2280 ± 71	+ 0,7
co	5,97 ± 1,2	5,48 ± 0,49	- 8.1
Cr	0,27 ± 0,16	0,28 ± 0,08	+3,8
Cu	10,2 ± 3,2	11,2 ± 2,9	+10

Fe	23,7 ± 9,8	25,9 ± 4,8	+9
I	20,2 ± 8,9	22,7 ± 3,7	+ 12
Mn	0,85 ± 0,25	0,80 ± 0,07	- 5.9
Sb	0,03 ± 0,01	0,033 ± 0,01	+10
Se	0,35 ± 0,04	0,32 ± 0,062	+ 8.4
U	0,14 ± 0,15	0,16 ± 0,03	+ 13
Zn	174 ± 31,5	180 ± 15	+ 3.4

The correctness of the method is closely related to its reproducibility, but good reproducibility does not yet indicate high correctness, which largely depends on the completeness of all errors that can be observed during the analysis.

## The course of adaptation processes to various designs of dentures

The analysis of the functional and hygienic state of the oral cavity was carried out in 47 MPZ workers and 50 TTZ workers. By age and gender, the compared groups of people were identical. Studies have shown that only 21% of MHP workers took care of their teeth regularly. The rest did it unsystematically. In the control group, they regularly brushed their teeth 65%, irregularly 35%. The results of the functional and hygienic study of workers are presented in Table 5, 6.

Table 4

Hygienic condition of the oral cavity of workers

Groups of surveyed		Workers MPZ	Workers TTZ
Indicators			
Hygienic condition of the oral cavity		1,8 ± 0,12	1,3 ± 0,15
OHI			
Kulazhenko's test		14,9 ± 1,5 c	20,1 ± 1,9 c
Shiler- Pisarev's test	Positive ++	35	12
	Weakly positive+	14	14
	Negative -	4	16
Index PMA		48,2 ± 3,1	40,5 ± 2,5

From the data presented in Table 5, it can be seen that the hygienic condition of the oral cavity of persons working in the MPZ is significantly lower than that of workers not related to microelementosis. The index of oral hygiene according to Fedorova and Volodkina for MPZ workers is unsatisfactory - 1.8+0.12 points. TTZ workers have a satisfactory condition - 1.3+0.15 points. Workers with a poor hygiene index have dental deposits and plaque. Dental deposits are usually located in the cervical region. The plaque was located in a thin layer on the labial surface, more often dark green in colour, which is explained by the deposition of polymetallic dust on the necks of the teeth.

The resistance of mucous membrane capillaries has been significantly reduced: 14.9+1.5 sec in working MPZs compared to working TTZ - 20.1+1.9 sec, which is regarded by a number of authors as an indicator of the initial stage of inflammatory process.

Table 5. Hygienic condition of the oral cavity of the examined persons depending on the length of service in the conditions of the MPZ

Work experience indicators		Until 5 y	After 5 лет
Hygienic condition of the oral cavity		1,7 ± 0,12	1,9 ± 0,09
		1,2 ± 0,20	1,4 ± 0,15
Kulazhenko's test		16,2 ± 1,2	13,2 ± 0,8
		22,5 ± 1,6	19,8 ± 1,3
Index PMA		46,8 ± 2,1	50,6 ± 3,0
		39,3 ± 1,6	41,8 ± 2,3
Shiller-Pisarev's test	Positive ++	31	38
		10	14
	Weakly positive +	12	16
		13	15
	Negative-	3	5
14		18	

Note: the numerator has the specified survey data of MPZ employees, the denominator has similar data of TTZ employees.

The number of examined persons according to the positive Schiller-Pisareva test differs noticeably. The presence of glycogen in the mucous membrane is regarded as a criterion of metabolic shifts, which in persons with normal metabolism for the most part gives a negative test result. According to the literature, persons with a normal condition of periodontal tissues are characterised by low values of the hygienic state of the oral cavity, high resistance of capillary walls and low values of papillary-marginal-alveolar index (PMA).

The examined employees of the MPZ in terms of oral hygiene differed significantly from those of a related specialty, but working in the best hygienic conditions. Apparently, the study of the microelement composition of polymetallic dust in the premises of the workshops of the studied enterprises will more fully respond to the causes of deterioration of periodontal tissues.

Long-term work in production, in which a significant content of trace elements was found, undoubtedly affected the hygienic condition of the oral cavity. Although, in the statistical analysis of the reliable difference between the studied parameters and the duration of the length of service was not found, obviously, the deterioration of the indicators of the Schiller-Pisareva sample, the hygienic index and the RMA index. The resistance of capillary walls in persons working in this production for a longer time is significantly reduced.

The high rates of the Schiller-Pisarev sample (91.3+1.9%) of the working MPZ are due to high labour intensity, pollution, high temperature, the presence of sulphur oxides in the air of the working area, high concentrations of microelements - antioxidants compared to the control group (20.2+0.3%).

Thus, the analysis of functional survey data of persons working in the production of MPZ in comparison with similar employees

TTZ, showed a significant deterioration in the hygienic condition of oral tissues. This was also confirmed during functional tests. Functional samples reflecting the state of periodontal tissues changed in persons depending on the

length of service, i.e. depending on the duration of contact with an increased content of polymetallic dust.

Studies conducted in 34 practically healthy people (Tashkent control group) showed that the red border of the lips had a normal colour and satisfactory humidity. 3 examinees had a slight peeling of the lip surface. No special changes were observed on the mucous membrane of the hard, soft palate and the bottom of the mouth. The vascular pattern is pronounced on the mucous membrane of the soft palate, less on the hard sky. When examining gingival tissue in the area of teeth with artificial crowns, it was found that in most cases it does not differ from the norm.

During the dentoscopic examination of the surface of the tongue, uniform papillae pink mucous membrane of the tongue are observed. The size, number of place of position of filamentous, mushroom-shaped, leaf-shaped and grooved papillae had individual differences.

When examining the oral mucosa, 12 working MPZs with an intact tooth range noted the deposition of a significant amount of dust in the folds of the tongue and palate, transitional folds of the mucous membrane, gum pockets. Objectively manifested in the form of plaques on the tongue, cheeks and along the gingival edge from dark brown to dark green.

The workers of the metallurgical shops of the MPZ were found to have hyperkeratosis of the mucous membrane of both cheeks along the tooth clocking line. Dentists have determined the relative thickening of the horny layer of the mucous membrane of a whitish shade against the background of a oedematous, slightly hyperaemic mucous membrane.

A severe form of catarrhal gingivitis was observed in 9 patients working in the electrolysis shops of the MPZ. Complaints were made about the presence of an unpleasant metallic taste in the mouth and bleeding gums. Dentoscopically: the mucous membrane of the gums had significant cyanosis, was bleeding, the gingival papillae were loose, pasty, in 2 patients there was discharge from the gingival

pockets under palpation pressure. Hypertrophic gingivitis was noted in 13 patients working at the MPZ, the air of which contained polymetallic dust with a high content of selenium and zinc. At the same time, the gingival papillae were sharply swollen, floated onto the crowns of the teeth, their apices were rounded, and bled easily at the slightest irritation.

In workers with more than 10-15 years of experience, periodontitis was observed with exposure of the roots and uneven atrophy of the mucous membrane around the neck of the teeth. Complaints were made of spontaneous bleeding, itching, enlargement, and pain in the gums. A large amount of viscous saliva was released. The examination revealed congestive diffuse hyperemia of the gingival margin, cyanosis, and deepening of the periodontal pockets.

Periodontitis was detected in 10 (22.2%) people. It is likely that the increase in the incidence of periodontal diseases in workers at medical facilities is associated with chronic intoxication caused by compounds of copper, zinc, selenium, etc.

Dental examinations of the condition of the oral mucosa were carried out in 35 workers with various dentition defects. A study of the frequency of typical forms of missing teeth showed that 21 workers had the absence of 1 to 3 teeth (small defects), and 14 workers had 4 to 9 teeth (medium defects). The division into groups was carried out according to the Mamluk classification.

In workers with minor dentition defects, the mucous membrane of the alveolar process in the place where teeth were missing had a pale color, blood vessels could not be traced, and sometimes had a loose consistency.

In workers with moderate defects, the mucous membrane of the alveolar process was dense, slightly hyperemic, with a clear pattern of blood vessels, which is explained by the active participation of the mucous membrane of the alveolar process in the mechanical processing of food, as a result of which the trophism of the tissues of the prosthetic bed improves (Irsaliev Kh.I., 2002) .

In most workers with MPZ and TTZ, imprints of antagonist teeth are visible on the buccal mucosa in areas corresponding to the border teeth. Workers in most cases (83.7%) noted difficulty chewing, changing the usual side of chewing by switching it to premolars and anterior teeth. In the presence of medium end defects in 8-9% of workers, the mucous membrane of the alveolar process was involved in the mechanical processing of food. In several cases, various elements of leukoplakia (spots, plaques, erosions) were identified against the background of edematous, hyperemic mucous membrane, localized symmetrically on both cheeks along the line of closure of the teeth and in the area of the corners of the mouth.

During the examination of MPD patients, the condition of existing removable and fixed dentures and their hygienic characteristics were studied. This quality assessment made it possible to divide the examined prostheses into the following groups (Table 6).

Table 6. Condition of dentures of the examined persons, AGMK employees

condition of the prosthesis	Number of prostheses	%
Good	14	1 5,73
Satisfactory	27	3 0,33
Unsatisfactory	48	5 3,94
Total	89	100

When visually assessing the hygienic condition of removable dentures, the following data were obtained:

The examined bridges were covered with soft and hard plaque, sometimes with deposits of soft plaque and tartar, and the soldering areas were dark with visible pores. Plastic crowns and facets are discolored, their surface is corroded, and tarnishing of gold crowns and bridges is noted. Removable dentures often did

not correspond to the prosthetic field. Roughness and discoloration of the plastic denture bases (from dark brown to dark green), abrasion of artificial teeth, etc. were observed.

When providing prosthetics for patients with partial secondary edentia, preference was given to non-removable denture designs. As practice shows, fixed bridge structures are characterized by their small size, high chewing efficiency and great strength.

When choosing prosthesis designs, much attention was paid to the periodontal condition of the supporting teeth, the size of the defect in the dentition and the hard tissue of the coronal part of the supporting teeth.

In the process of work, 21 patients of the MPZ were manufactured with fixed metal bridges and crowns and 8 patients with clasp prostheses made of Cr-Ni, Cr-Co alloys.

As a control, fixed bridges were made to 19 patients who applied to the orthopedic dentistry clinic 1-Tashkent State Medical Institute. All prostheses met clinical and technical standards, i.e. did not have any side effects on the organs and tissues of the patients' oral cavity.

After fixing the metal structures of dentures in

During the first 7-10 days, patients in the control group presented complaints about the presence of a foreign body in the mouth, increased salivation, a feeling of awkwardness when moving the lower jaw, which disappeared during the first 10-15 days, and in the group of patients working at the medical center, they persisted until 28-30 days.

A dental study revealed that the artificial crown, both single and supporting, in 78% of cases in patients in the control group caused inflammation of the mucous membrane of the gingival margin of varying severity.

In patients with MPZ, inflammation of the gingival margin was detected in 91% of cases stomatoscopically. The mucous membrane of the lips and cheeks is moist, pale pink in color with a poorly developed vascular pattern. The mucous

membrane of the alveolar ridge is dense and pale pink. In 9 patients, tooth marks were noted on the surface of the tongue, and the back of the tongue was covered with a white coating. The edges of the supporting crowns of the bridges did not violate the circular ligament of the tooth, and there was a good washing system. The patient's bite was not disturbed; the crowns and bridge bodies were in maximum contact with the antagonists.

By day 20-25, most patients forget that they have dentures in their mouth. In the group working in workshops with a high content of sulfur dioxide, this period increased to 28-30 days. The previous complaints were supplemented by the appearance of a metallic taste in the mouth. By day 21, the mucous membrane in most patients was without any visible changes. In 7 patients (97.0%), dental examinations revealed severe hyperemia of the mucous membrane in the areas of contact with the body of the dentures; the alveolar processes and gingival papillae were swollen, hyperemic, and hypertrophy was observed. The red border of the lips was dry, without signs of peeling.

By 2-3 months, in several cases there was a change in the color of the prostheses at the soldering points and darkening of the plastic linings artificial teeth, which was explained by the presence in the air of the working area of sulfur dioxide, acid vapors, and polymetallic dust consisting of metals of variable valence, causing a change in the pH of the oral fluid.

A study of the pH of saliva in workers at medical facilities showed that in 68.7-70.4% of cases the saliva had an acidic environment (pH - 4-6). Conducted by A.D. Abduazimov (1988) studies in model media showed an increase in the solubility of the elements copper, zinc, lead and other trace elements in an acidic environment, which explained the greater mobility of the elements in saliva and their deep penetration into the tissues of the oral cavity (gingival biopsies, tartar, crown and root of the tooth ) workers.

By the 30th day, in most patients, due to poor oral hygiene, there was an accumulation of food debris under the body of the bridge dentures, the basis of the

clasp denture, after removal of which, a dirty gray plaque was noted on the mucous membrane of the alveolar ridge.

Significantly more often than in the control group of patients, inflammation of the mucous membrane of the gingival papillae was observed under bridge-like prostheses made with defects in the dentition in the area of the anterior teeth. In the control group of patients using bridge structures of satisfactory quality, changes in the mucous membrane were practically no different from the mucous membrane of persons with intact dentition.

In 10 patients with MPD (24.4%), by 30-35 days keratoses were noted on the surface of the cheeks, and there was hyperemia on the lateral surface of the tongue in contact with the bridge. The mucous membrane differed from the norm by an increased pink tint with increased transparency of the epithelium and clearly defined radially directed contours of the underlying vessels.

By the 40th day, a number of patients examined complained of chewing food on one side, due to pain under the dentures, and also noted bad breath.

In all cases, if necessary, appropriate orthopedic and therapeutic treatment of the oral mucosa was carried out. After wearing bridges for a year, 12 patients showed hypertrophic changes in the gingival margin, the formation of pathological gingival pockets, and some noted dense plaque under the body of the bridge. In most cases, bridges and the mucous membrane around them did not differ significantly from those in previous prosthetics. Red border of lips without signs of keratinization. The mucous membrane of the lips, cheeks and soft palate is pale pink, moist, with a well-defined vascular pattern.

Thus, an analysis of the studies showed that 89% of workers who used metal structures of dentures were satisfied with the quality of the dentures. However, the process of adaptation to dentures among AGMK workers was significantly extended and amounted to 30-40 days, while in the control group this period was 7-10 days.

The decision to manufacture partial removable lamellar dentures (PRD) for the worker was made based on the availability of dental indications. Those patients who had severe inflammation of periodontal tissue were excluded from those examined.

18 patients underwent ESPP. In the first days of use, complaints of hypersalivation, the presence of a foreign body in the mouth, changes in speech and taste. In previous studies, Agzamkhodzhaeva S.S. (1998), it was shown that among patients in Tashkent (control group), these phenomena disappeared already on 5-10 days of using the ChSPP, and among workers at medical facilities this period extended to 12-15 days.

According to dental examination, the mucous membrane had a pale pink surface, the vascular network was not translucent. In most of the subjects, focal injuries were observed in the mucous membrane of the alveolar process, hard palate, along the transitional fold and, especially, in the areas of the marginal gums and remaining teeth. Focal damage to the mucous membrane was more common in the lower jaw. After 1-2 corrections of the prostheses, these phenomena disappeared.

The study of focal injuries in MPD patients shows the presence of violations of the integrity of the surface of the mucous membrane of the prosthetic bed, and in the areas of preserved teeth, traumatic damage was limited to the mucous membrane of the marginal periodontium, that is, trauma to the gum pocket in the form of detachment of the gum from the tooth. In these cases, correction of the prosthesis in the areas adjacent to the remaining teeth leads to the gradual disappearance of inflammation.

By day 14, patients in the control group did not complain of any discomfort. MPH patients adapted less well to ESPP. Hypersalivation persisted due to poor oral hygiene, in addition to the above complaints, complaints of bad breath were added. The surface of the dentures was covered with soft plaque. The condition of partially removable dentures in medical workers with good hygienic

care is satisfactory. In 3 patients, the mucous membrane of the prosthetic bed was swollen and hyperemic, the interdental papillae were inflamed.

Complaints about subjective feelings of discomfort disappeared by 2-3 months after the delivery of partially removable laminar dentures. Dentoscopically, a pale pink mucous membrane of the prosthetic bed with imprints of the contours of the borders of the prosthesis, covered with a soft coating, is noted. On the inner surface of the prosthesis there is a grayish-yellow coating, an unpleasant odor with food residues.

Examination of prostheses after a year of use shows a deterioration in their stabilization and fixation. In most patients, if oral hygiene was not observed, a dirty gray coating with dark green impurities was observed on the mucous membrane of the cheeks, gums and other parts, which is difficult to remove. Dentally, it resembles the plaque found on the bases of removable dentures, but the structure of the plaque contains admixtures of industrial dust. Plastic teeth are discolored and their surface is corroded. Removable dentures often did not fit the prosthetic bed. Roughness and discoloration of the plastic denture bases, abrasion of artificial teeth, etc. were observed. In several cases, part of the dental prosthesis was replaced with clasp structures.

The study of the content of microelements in saliva allows us to expand our understanding of the pathogenesis of changes occurring in the organs and tissues of the oral cavity in workers exposed to harmful factors in production.

It is known that macro- and microelements can enter tooth tissue from saliva (Fedorov Yu.A., 1979). In this case, saliva determines the conditions for enriching tooth tissue with minerals. It can be considered that one of the ways to study the pathogenesis of dental caries, periodontitis and, as a consequence of these diseases, dental defects in workers at the AGMK production is to study the quantitative content of microelements in saliva. Of great importance is not only identifying the presence of microelements, but also their concentration, which ensures their biological activity. In this regard, it is advisable to study the

quantitative fluctuations of microelements under various conditions of the dentition, as well as the influence of the designs of manufactured dentures.

A study of the hygienic working conditions of workers at the AGMK MPZ showed that the air in the working area of the main workshops is polluted by dust with varying metal contents, sulfur dioxide and sulfuric acid vapors. The entire process of blister copper smelting is accompanied by the release of polymetallic dust into the air; its concentration ranged from 14.1 to 42.6 mg/m<sup>3</sup>, i.e. exceeded the maximum permissible concentration by 7-20 times. A study of its physicochemical properties showed the presence of more than 15 elements: Cu, Zn, Fe, Cd, Pb, Mo, Au, Br, Na, Ag, Hg, Cr, Co, Se, Te. (Table 7)

Constant contact of the examined MPP workers with industrial dust led to a change in the microelement composition of saliva. Neutron activation analysis detected the following microelements in saliva: copper, selenium, manganese, cadmium, mercury, chromium, antimony, scandium, zinc, cobalt, iron (Table 8). Moreover, the concentration of selenium, zinc and copper exceeded the similar indicators of TTZ workers by 60; 4.2 and 16.5 times respectively. At the same time, the content of iron, chromium and cobalt was reduced by 2.4; 5.0 and 1.8 times respectively.

According to the direction of regulation of biochemical reactions, these microelements are divided into FRO inhibitors - antioxidants (Se, Zn, Cu), activators of these reactions - pro-oxidants (Fe, Co, Cr).

The first group of microelements includes selenium, zinc, copper; the second - iron, cobalt, chromium. A number of microelements do not change the rate of free radical reactions, but their accumulation in the body leads to a toxic effect (mercury, antimony, scandium).

The division of elements into quenchers of free radical oxidation - antioxidants and activators - pro-oxidants was carried out on the basis of studies of their effect in model systems (Vladimirov Yu.A. et al., 1972).

Trace element composition of polymetallic dust in working areas of a copper smelter ( $\mu\text{g/g}$ )

Note: the denominator shows the results of a study of polymetallic dust in the premises of the TTZ, the reliability of the differences is given in the text.

Table 8

Trace element composition of polymetallic dust in working areas of a copper smelter ( $\mu\text{g/g}$ )

Cu	Mn	Au	CD	hg	Cr	co	Se	Zn	Fe
1280+	0,1+	563+	150,1+	0,01+	0,72+	0,33+	82,0+	42,9+	430+
–	–	–	–	–	–	–	–	–	–
48	0,01	18.9	8.4	0,001	0,05	0,003	4.1	1.6	21.9
22.1+	0,2+	2.1+	30,5+	0,001	1,2+	0,66+	5,6+	2.1+	1150
–	–	–	–	$\pm$	–	–	–	–	$\pm 52$
0,9	0,01	0.1	0.3	0,001	0,02	0,006	0,5	0,2	

Note: the denominator shows the results of a study of polymetallic dust in the premises of the TTZ, the reliability of the differences is given in the text.

Table 9

**Trace element composition of mixed oral fluid of copper smelter workers ( $\mu\text{g/g}$ ).**

Cu	Mn	Au	CD	hg	Cr	co	Se	Zn	Fe
368+	1,5+	0,1+	1,8+	4.3+	3.4+	0,14+	0,94+	34,9+	730+
–	–	–	–	–	–	–	–	–	–
32	0.1	0,03	0.1	0,2	0,29	0,01	0.1	0,7	o'ttiz
80+	0,4+	8,6+	40 $\pm$	0,5+	0,5+	0,25+	0,02+	9,6+	964+
–	–	–	2	–	–	–	–	–	–
3.3	0.1	0,9		0.1	0,01	0,01	0,005	0,5	48

Note: the denominator shows the results of a study of mixed oral fluid of TTZ workers, the reliability of the differences is given in the text.

Table 8. Microelement composition of saliva of workers of the AGMK in comparison with the microelement composition of hair of workers of the refractory and heat-resistant metals plant (UzKTZHM)  $\mu\text{g/g}$ .

El ements	Saliva of AGMK workers	Hair of female workers of UzKTZHM (Vakhidova D.R., 1993)
Cu	1100,0 $\pm$ 84,0	3, 3 $\pm$ 1,0
M n	1,5	0,69 $\pm$ 0,13
Zn	34,8 $\pm$ 0,7	14 5 $\pm$ 13
Se	0,94 $\pm$ 0,01	0,42 $\pm$ 0,09
Co	0,12 $\pm$ 0,01	1, 48 $\pm$ 1,0
Fe	730,0 $\pm$ 30,0	10 5 $\pm$ 47
Cr	3,4 $\pm$ 0,21	0,52 $\pm$ 0,22
H g	4,3 $\pm$ 0,46	0,11 $\pm$ 0,027
Dr	14,7 $\pm$ 2,86	7, 9 $\pm$ 2,8
Sb	0,09 $\pm$ 0,002	0, 6 $\pm$ 0,18
Sc	0,02 $\pm$ 0,001	0,43 $\pm$ 0,09

The content of these microelements was studied in the dynamics of adaptation processes to removable and non-removable denture designs.

The higher content of copper and gold in polymetallic dust was apparently associated with the specifics of MPZ production. The results obtained were statistically significant. At the same time, studies of the content of manganese, cadmium and mercury showed the unreliability of the differences in the results found.

The first group, as noted above, includes microelements - antioxidants - zinc, selenium (diagram 1). The content of these elements in MPD patients with

intact dentition, metal and partially removable lamellar dentures, and CPPS was different.

In individuals with partial secondary edentia, the content of antioxidant microelements in saliva was increased compared to the control group.

group. During the process of prosthetics and adaptation to dentures in patients with metal structures of dentures, the concentration of zinc and selenium in saliva decreased, and after the delivery of the dental prosthesis, on the contrary, it increased sharply. Moreover, the change in zinc content in the saliva of MPZ workers is more pronounced.

A study of the content of microelements of the pro-oxidant action of cobalt, iron, chromium (Diagram 2) showed an increase in their concentration in saliva during the period of adaptation to various designs of dentures.

The content of microelements that are part of antioxidant enzymes, manganese and copper (diagram 3), increased significantly after prosthetics. Apparently, restoration of the integrity of the dentition leads to an increase in the intake of microelements into the body of patients. This was confirmed by the study of the concentration in the saliva of workers at the medical facilities of microelements that have a toxic effect - cadmium, mercury (Diagram 4). Their concentration in saliva also increased after prosthetics.

Thus, working conditions undoubtedly influenced the microelement composition of the oral fluid of AGMK workers. From the results obtained, it is necessary to emphasize the significant content of antioxidant elements (selenium, copper, zinc) in the oral fluid of workers of the MPZ, while in the workers of the control group (TTZ) an increase in the accumulation of elements of pro-oxidant action was found.

The content of copper and elements of antioxidant action was significantly increased in the mixed saliva of workers at the medical facility ( $P < 0.01$ ). Along

with this, we found a significantly low content of elements with pro-oxidant properties ( $P < 0.05$ ). The literature has accumulated a sufficient amount of data on the activation of lipid peroxidation in the body of workers associated with the production of heavy metals and metallurgical plants (Yunusova R.T., 1997). The authors associate biochemical changes in saliva with the toxic effect of prooxidant elements on the body's antioxidant system, which leads to its destabilization, and recommend antioxidant therapy. In dental patients with more than 6 metal units in the denture structure in the mouth, activation of lipid peroxidation was detected, and therefore antioxidant therapy was proposed. (Agzamkhodzhaev S.S., 1998)

A comparative analysis of the intensity of free radical oxidation in the saliva of medical workers with partial dentition defects showed less accumulation of peroxidation products in the oral fluid in this group of subjects (Table 9). This is probably due to longer contact of this group of people with polymetallic dust containing a significant amount of antioxidants. Studies of the microelement composition of the saliva of MPZ workers with intact dentition and in persons with partial absence of teeth showed the absence of significantly significant differences, and therefore we considered it unnecessary to present the results of neutron activation analysis.

The level of spontaneous lipid peroxidation and in induced lipid peroxidation systems in medical workers with intact dentition and partial secondary edentia is practically not differed ( $P > 0.05$ ). The examined MPD patients had the following dental defects, with the absence of 4 to 6 teeth, i.e. general need for dental prosthetics was 8-9 units. The selection of such a group of patients was due to the fact that in the literature there is data on the dependence of the intensity of lipid peroxidation in saliva on the size of the dentition defect (Agzamkhodzhaev S.S., 1998; Zufarov S.A. et al., 1999).

Table 9. Intensity of free radical oxidation of lipids in mixed saliva of copper smelter workers.

indicators examined	Fre	ZP	IP	P	G
	e	A		E/	
	nmol malonic dialdehyde/mg protein* min			mg	lipids
Control Tashkent (with intact dentition) n=15	26, 5 ± 0,9	53,0 ± 0,79	99 ,7±1,15	0,83 ±0,02	
Control, medical workers (with intact dentition) n=12	18, 9 ± 0,63	31,6 ± 1,13	59 ,9±1,4	1,1 9±0,12	
MPZ workers with partial defects dentition n=36	18, 79±0,70	30,8 1±0,94	58, 09±0,83	15,1 8±0,78	
P 1:2	□ 0,05	< 0,05	□ 0,01	0,05	
P 1:3	□ 0,05	< 0,05	□ 0,01	0,01	□
P 2:3		0,05	0,0 5	0,01	□

Determination of the content of hydroperoxides in saliva showed that in patients with partial secondary edentia working in medical work, it is 1.3 times higher than in persons with intact dentition

(Table 9). A number of works provided data on the activation of lipid peroxidation in saliva during partial secondary adentia (Agzamkhodzhaev S.S., 1997; 1998). However, the results of our research show that workers of the Ministry of Health as a result of the increased intake of antioxidant elements, a decrease in the intensity of lipid peroxidation was observed, as evidenced by a decrease in the amount of MDA in saliva.

Studies of the intensity of free radical oxidation of lipids in the saliva of MPZ workers with intact dentition, in comparison with similar studies of TTZ workers, showed a lower content of free malondialdehyde. A decrease in the

intensity of native LPO was found, along with a spontaneous change in the kinetics of LPO. The intensity of WGA and WIP are identical. The last two studies are carried out in vitro and indicate the potential capabilities of the antioxidant system of saliva when induced by activators of various types (Table 9).

In medical workers, the high content of antioxidant elements in saliva led to a significantly low level of lipid peroxidation in the oral fluid, as evidenced by the lower content of free MDA and the low level of inducible lipid peroxidation systems (Table 9). However, the studied environmental factor did not affect the accumulation of intermediate LPO products, in particular, in the content of hydroperoxides.

In the literature there are isolated works devoted to the study of the effect of high doses of AO elements on the activity of enzymes and on the state of the detoxifying function of the liver (Yunusova R.T., 1997).

Biochemical studies of the composition of saliva have shown that a higher content of antioxidant elements leads to a decrease in the activity of the endogenous antioxidant defense system - enzymes (Table 10).

Table 10. Antiperoxide activity in mixed saliva of copper smelter workers.

Group Indicators	Total protein g/l	All lipids mg/ml	AIIA mmol H <sub>2</sub> O <sub>2</sub> /ml
Control Tashkent (with intact dentition) n=15	6,5 ± 0,3	0,13 ± 0,002	34,3 ± 0,8
Control, medical workers (with intact teeth nearby) n=12	9,2 ± 0,37	0,089 ± 0,003	25,3 ± 0,78

MPP workers with partial dentition defects n=36	7,09 ± 0,45	0,20 ± 0,01	34,74 ± 1,04
P 1:2	<0,01	>0,05	<0,05
P 1:3	>0,05	>0,05	>0,05
P 2:3	>0,05	<0,01	<0,05

The antiperoxide activity of saliva is studied after cytolysis of the cells present in it and represents the total antiperoxide activity of a number of enzymes (catalase, glutathione peroxidase, myeloperoxidase) (Ibragimov U.K. et al., 1993). We found an increase in antiperoxide activity in the saliva of medical workers who require dental prosthetics by 12.8 times compared to a group of people with intact dentition (Table 10). Studies of total lipids have shown that a decrease in the intensity of free radical oxidation

Shapiro L. et al. used protein concentration as an indicator of the body's response. Depending on the age of the patient

As the period of use of dentures increases, the amount of protein washed out with saliva changes. The content of total protein in the saliva of MPP workers was slightly higher than the control level in persons working in more favorable working conditions (Tashkent).

This is probably due to an increase in the power of enzymes of the antioxidant system.

Thus, in the oral fluid of MPZ workers, the increased content of antioxidant elements affected its physicochemical properties. In medical workers, the intensity of lipid peroxidation in the free state and in induced systems is significantly lower than similar indicators in the control group. At the same time, low activity of antioxidant enzymes was found in the studied group of medical

workers. Apparently, the excess content of copper, selenium, and zinc in the oral fluid of MPZ workers compensates for the activity of AOS enzymes. It is important to note that the activation of LPO in the oral fluid in persons with partial dentition defects, discovered by a number of authors (Zufarov S.A. et al., 1997; Agzamkhodzhaev S.S. et al., 2000) in this study, among workers No MPD was detected. The study of the content of LPO-GP intermediate products in oral fluid coincided with literature data.

A number of researchers, when studying the intensity of lipid peroxidation in oral fluid and blood, found unidirectional changes, which allowed the authors to conclude that the study of only oral fluid in dental diseases is informative (Yakubov R.K., 1993; Kurbanov Sh.Sh., 1996; Azimov M. I., et al. 1995).

In the cited works, the authors found activation of lipid peroxidation in a number of dental diseases, which served as a basis for recommending antioxidant therapy.

The use of a natural antioxidant and a synthetic antioxidant led to an acceleration of the restoration of the antioxidant system (Kurbanov Sh.Sh., 1997), which generally affected the condition of the patients.

Consequently, the literature data reflect the state of AOS deficiency in patients with LPO activation. We found the opposite situation in workers at medical facilities, when the environment contains a significant amount of elements - antioxidants. A few studies present the results of the negative impact of excess antioxidants on the liver enzyme system in experiments (Tutelyan V.A., 1995) and in children (Yunusova R.T., 1997). At the same time, there are no studies of the lipid peroxidation level of oral fluid with excessive intake of AO into the body.

Previously, it was shown that the air in the industrial premises of the MPZ contained a large amount of antioxidant elements - zinc, selenium. As a result, a decrease in the number of elements with pronounced pro-oxidant properties was observed. The imbalance in the body of working MPZ elements -

antioxidants relative to microelements that enhance free radical oxidation of lipids, led to a significant change in the biochemical properties of oral fluid. The study of saliva of patients with medical problems was carried out before dentures and on the 7th, 14th, 21st, 28th day of using dentures. The data presented in Table 12 indicate a low level of lipid peroxidation products in the oral fluid of patients with partial dentition defects. Usually these are persons with extensive work experience at a given enterprise. Patients with partial large defects of the dentition had a low content of free malondialdehyde, although the content of hydroperoxides was significantly higher than that of individuals in the control group (employees of the TTZ) and relative to individuals with intact dentition, workers of the MPZ. In the process of adaptation

In patients wearing dentures, activation of lipid peroxidation was noted with a maximum on the 14th day of using dentures. By the end of the studies, there was a slight downward trend in the studied indicators. (diagram 5).

When studying the intensity of lipid peroxidation in oral fluid when inducing it with ascorbate and NADPH, the same tendency for an increase in peroxidation products was found, but the intensity of accumulation is low, which indicates the high potential of the antioxidant defense system. By the 28th day after prosthetics, we found an increase in the accumulation of MDA in the enzyme-independent and enzyme-inducible systems in the oral fluid of patients by 1.2 and 1.14 times, respectively (Table 11). Unlike TTZ workers, MPP workers, due to the excessive intake of antioxidants into the body, had a low potential for antioxidant protection to induce lipid peroxidation in vitro. In patients and medical workers, 28 days after prosthetics, an increase in MDA accumulation in ascorbate- and NADPH-dependent states was observed, respectively, by 2.0 and 1.27 times, i.e. significantly more than for TTZ workers. (diagram 6.7).

A similar response was noted by a number of researchers when studying the adaptation of patients to removable prosthetics (Agzamkhodzhaev S.S., 1996;

Zufarov S.A. 1998 and others). The authors offered these patients antioxidant corrective therapy.

Diagram 5. Indicators of spontaneous LPO in the saliva of patients employed in the production and processing of non-ferrous metals.

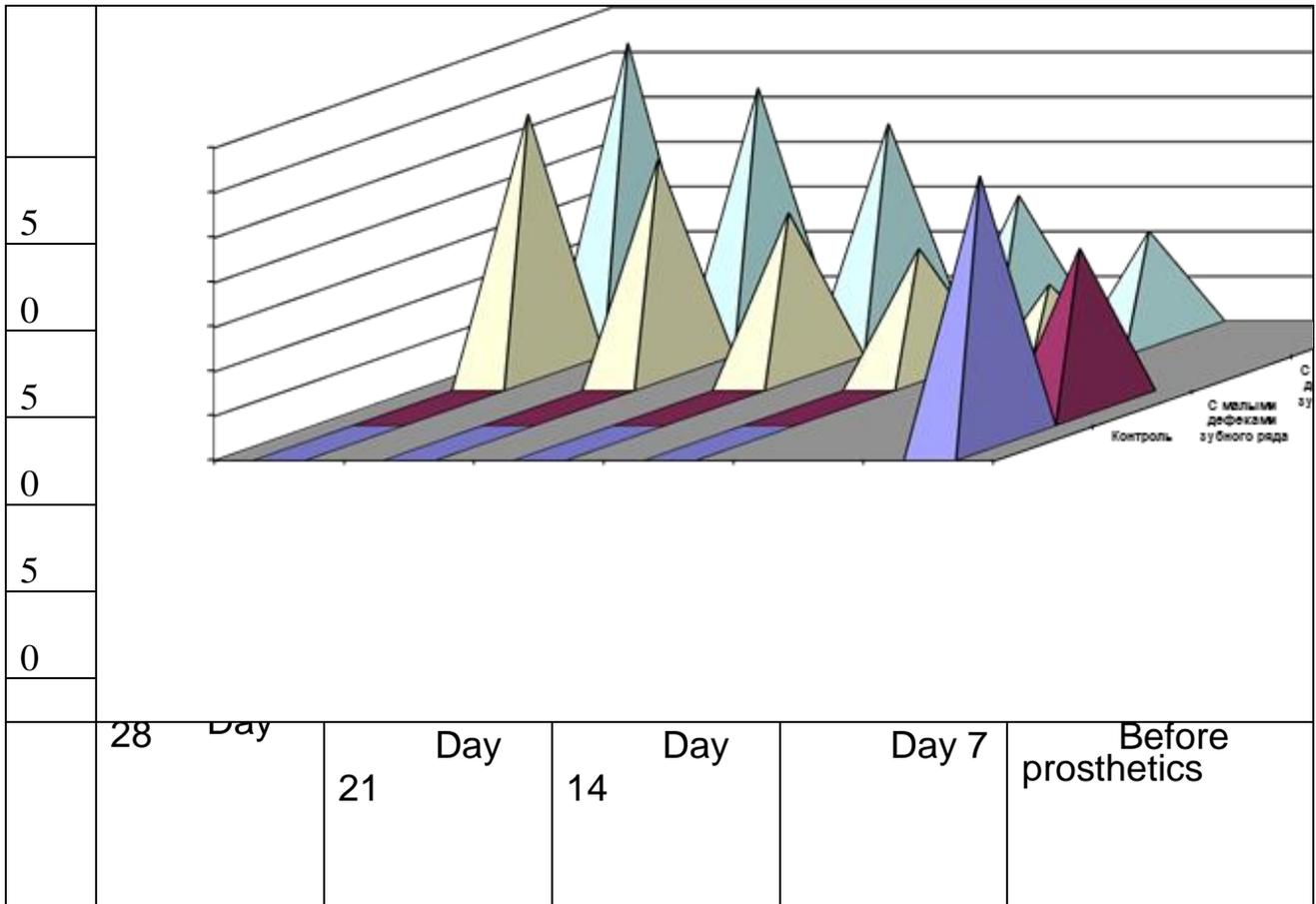
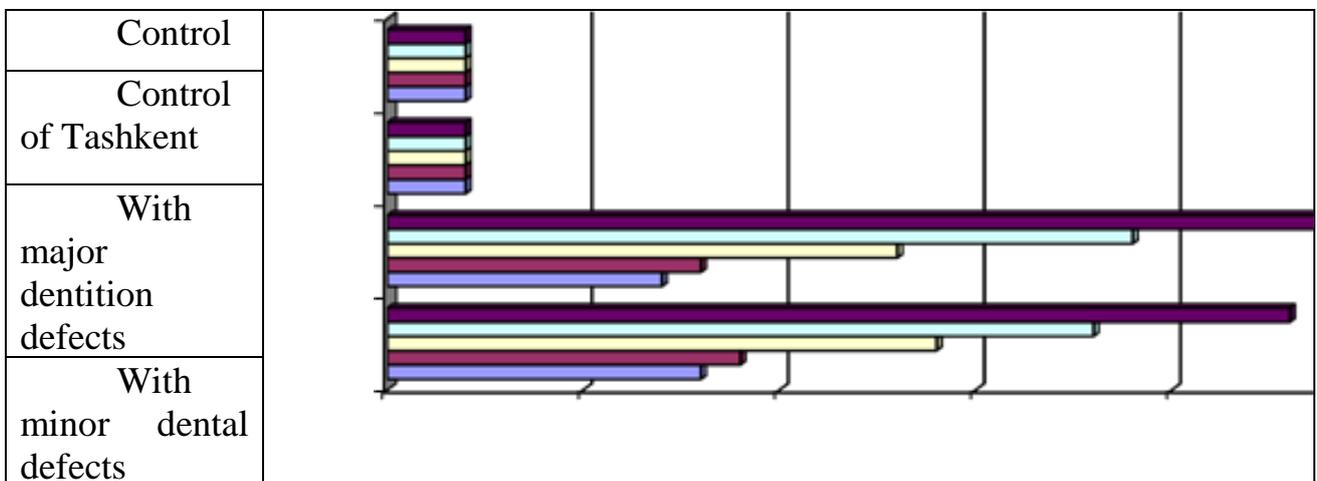


Diagram 8. Content of lipid hydroperoxides in the saliva of patients involved in the production and processing of non-ferrous metals.



0	0	10	15	20	25
0	28	21	14	7	0
	Day	Day	Day	Day	Day
					Before prosthetics

Table 11. Parameters of peroxidation in the saliva of working medical devices in the dynamics of adaptation to emergency prostheses.

Index	Free MDA, nmol/mg protein.min	WGA, nmol/mg protein.min	WIP, nmol/mg protein.min	GP, U/mg lipids
Control group (Tashkent)	26,5±0,9	53,0±0,79	99,7±1,15	0.83±0,02
Persons with intact dentition, medical workers	18,97±0,63	31,61±1,13	59,99±1,47	1,197±0,22
Persons before intact dentition	17,22 ± 0,75	28,07± 0,98	61,63± 0,61	14,77 ± 0,52
After 7 days	20,66± 0,82	36,34± 0,83	67,13± 0,63	20,8± 0,65
After 14 days	23,44± 1,0	42,07± 0,89	67,33± 0,64	23,80± 0,58
After 21 days	21,09± 0,99	37,86± 0,84	63,97± 0,62	22,61± 0,57
After 28 days	20,04± 0,96	34,07± 0,80	62,69± 0,61	21,48 ± 0,55

Note: the significance of the differences in the results obtained compared to the data of patients before prosthetics (P<0.05).

However, our data suggests that in individuals with a high content of antioxidant elements, one can refrain from this recommendation. The most adequate indicator of changes in the biochemical properties of oral fluid during secondary adentia is the content of hydroperoxides. The content of GP in the oral fluid of dental patients with MPD before prosthetics was 12.2 times higher than

that of the control group with intact dentition. In the dynamics of the development of adaptation to dental prostheses, an increase in the content of GP in the oral fluid was found on the 14th day of the study with a maximum and a gradual decrease by the 28th day (Table 11, Diagram 8). This assumption was confirmed by the study of the antiperoxide activity of oral fluid in this group of patients (Table 12). In patients after prosthetics of the ChSPP with dentures, the dynamics of the studies revealed an increase in antiperoxide activity, which significantly exceeded the same indicator for controls from the city of Tashkent and persons with intact dentition.

Table 13. Antiperoxide activity of saliva of working dental workers and the content of protein and lipids in it in the dynamics of adaptation to dental prostheses.

Index Duration of the study	APA, nmol H <sub>2</sub> O <sub>2</sub> /ml saliva.min	Total lipids, mg/ml saliva	Total protein, mg/ml
Control group (Tashkent)	34.3±0,8	0,13±0,00 2	6,5± 0,37
Persons with intact dentition, medical workers	25,3±0,7 8	0,087±0,0 06	9,20±0,37
Persons before intact dentition	34,51±0, 86	0,117±0,0 4	7,13± 0,45
After 7 days	42,30±0, 95	0,124±0,0 5	9,60±0,52
After 14 days	46,05±0, 63	0,130±0,0 5	10,3±0,4
After 21 days	47,09±0, 89	0,217±0,0 8	9,54±0,38
After 28 days	41,65±0, 85	0,238±0,0 7	9,46±0,39

Note: the significance of the differences in the results obtained compared to the data of patients before prosthetics (P<0.05).

To clarify the relationship between LPO activation and changes in the amount of oxidation substrates, the total lipid content was studied.

The content of total lipids in the saliva of working dental workers in the process of adaptation to removable dentures increased by 2 times and on the 28th day did not tend to decrease (Diagram 9). Thus, prosthetics of the ChSPP leads to the activation of LPO and an increase in the content of OL in saliva of MPH patients. The amount of OB increased during the adaptation process by 1.4 times, reached a maximum by day 14 and gradually decreased by day 28 to the initial level.

Diagram 9. The content of total lipids in the saliva of patients involved in the production and processing of non-ferrous metals.

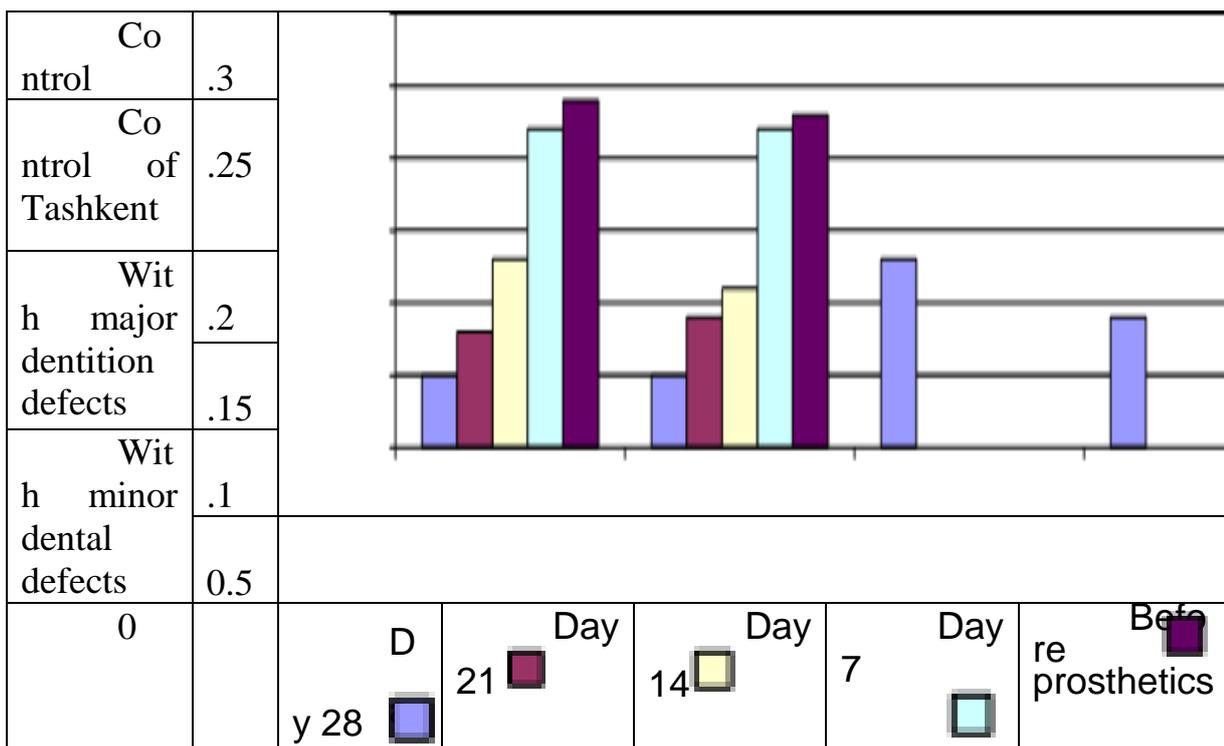


Diagram 10. The content of total protein in the saliva of patients involved in the production and processing of non-ferrous metals.



Control of Tashkent	5					
With major dentition defects	0					
	5					
With minor dental defects	0					
0		Day 28 	Day 21 	Day 14 	Day 7 	Before re prosthetics 

Thus, the process of adaptation of the ESPP occurs with the participation of SRO activation and (changes in the activity of the antioxidant defense system) an increase in all biochemical parameters (Diagram 10).

Fixed denture structures are used to replace defects in the crown of teeth, small and medium-sized defects in the dentition. Previous studies (Burlakova E.B., 1982) established that the metals Fe, Co, Cr from which a fixed denture is made have the ability to participate in redox processes and initiate SRO.

A study of the biochemical properties of oral fluid in patients requiring fixed prosthetics showed that the accumulation of free malondialdehyde is slightly lower than in the previous group of patients. Apparently, this is due to the fact that people in this group had less work experience in medical facilities, and, therefore, the accumulation of antioxidant elements is less pronounced. The content of free malondialdehyde in the oral fluid increased in the dynamics of adaptation to removable metal and fixed dentures (Diagram 5), reaching its maximum value by the third week after the delivery of the dentures. The intensity of enzyme-dependent LPO and WPI tended to increase (Table 13, Diagram 6).

Along with this, an increase in the antiperoxide activity of saliva was found in medical workers with partial secondary edentia. Apparently, an increase in the content of microelements with antioxidant activity reduced the accumulation of end products of lipid peroxidation, while the content of intermediate lipid peroxidation products (acyl hydroperoxides) remained high. (diagram 11).

Table 14. Parameters of peroxidation in the saliva of medical workers in the dynamics of adaptation to removable and fixed metal prostheses.

Index Duration of the study	Free MDA, nmol/mg protein.m in	WGA, nmol/mg protein.min	WIP, nmol/mg protein.mi n	GP, U/mg lipids
Control group (Tashkent)	26,5±0,9	53,0±0,79	99,7±1,15	0,83±0,02
Persons with intact dentition, medical workers	18,97±0,6 3	31,61±1,13	59,99±1,4 7	1,197±0,2 2
Persons before intact dentition	18,79±0,7	30,81± 0,94	58,09±0,8 3	15,17± 0,6
After 7 days	26,31±0,8 2	38,78 ± 0,98	60,63±0,9 5	16,69±0,6 9
After 14 days	24,18± 1,0	45,48± 1,0	64,06± 0,97	18,36± 0,72
After 21 days	33,86± 1,25	54,82± 1,2	69,78± 0,95	19,83± 0,66
After 28 days	28,76± 0,89	61,9± 1,2	73,51± 1,1	23,18 ± 0,76

The intensity of peroxidation in the induced systems in the dynamics of adaptation to dentures increased, which made this group different from patients with removable dentures. Apparently, the presence of iron in the material from

which the denture is made, which has variable valence and pro-oxidant properties, led to the discovered effect.

The antiperoxide activity of saliva in patients with fixed dentures increased during the adaptation process, reaching its maximum value by the 21st day after dentures (Table 14). The maximum increase in malondialdehyde in saliva in this group of patients was synchronous with the greatest antiperoxide activity. (diagram 11)

In patients - medical workers with minor dentition defects, the content of GP in the oral fluid was higher than the control group before prosthetics by 18 and 1.53 times, respectively.

In both groups of patients, activation of lipid peroxidation and an increase in antiperoxide activity were not associated with changes in the amount of total lipids and total protein (Tables 14, 15). (Diagram 9,10).

Thus, a study of the processes of adaptation to removable and non-removable dental prosthetics of sick employees of the medical establishment showed that due to the increased content of antioxidant elements in the oral fluid, the content of peroxidation products was reduced compared to the control group and the group of people with intact dentition. Prosthetics with the inclusion of metal structures led to a slight decrease in the imbalance of elements of anti- and pro-oxidant action, which affected the biochemical properties of the oral fluid. The maximum accumulation of lipid peroxidation products in saliva was synchronous with an increase in antiperoxide activity in it. For persons working in industries with a high content of antioxidant elements, it is advisable to wear dentures made of stainless steel containing iron and chromium, which have pro-oxidant properties.

Similar studies were carried out in dynamics after prosthetics of patients with secondary edentia, adaptation to fixed dentures - workers of the territorial factory. We found that before prosthetics, the accumulation of free MDA in the spontaneous state of LPO was slightly higher than the level of the control group

(1.14 times). There was a slight downward trend in the rate in the first week of adaptation to dentures. The design of dentures was mainly represented by plastic parts for comparative analysis with a similar group of patients and hospital workers (Table 15). In healthcare workers with a similar dentition defect before prosthetics with removable dentures, the detected content of free malondialdehyde was significantly lower.

By the 28th day after using a denture, TTZ workers showed a tendency towards an increase in the accumulation of MDA, which is apparently associated with age-related characteristics and lower adaptive capabilities body. Confirmation of this is the lower level of MDA content in the oral fluid (1.24 times) in a similar group of patients and medical workers (Table 15).

Table 15. Parameters of peroxidation in the saliva of TTZ workers in the dynamics of adaptation to fixed dentures.

Index Duration of the study	Free MDA, nmol/mg protein.min	WGA, nmol/mg protein.mi n	WIP, nmol/mg protein.mi n	GP, U/mg lipids
Control group (Tashke nt)	26,5±0,9	53,0±0,79	99,7±1,15	0,83±0,02
Persons with intact dentition, medical workers	30,3±0,9	58,9±0,8	109,6±1,12	4,5±0,5
Persons before intact dentition	29,76±0,9	59,8±0,8	110,2±1,2	6,8±0,6
After 7 days	31,3±0,9	61,2±0,8	110,8±1,13	8,2±0,5
After 14 days	32,9±0,9	70,3±0,9	121,9±1,1	12,1±0,5
After 21 days	34,6±1,0	70,6±0,9	124,4± 1,2	12,5 ± 06

The most adequate indicator of changes in the biochemical properties of oral fluid during secondary adentia is the content of hydroperoxides. Thus, in patients requiring removable prosthetics, a slight increase in the accumulation of MDA was found. Whereas, the content of GP in the oral fluid of dental patients was 5.4 times higher than that of the control group with intact dentition. In the dynamics of development of adaptation to fixed dentures, an increase in the content of GP in the oral fluid was found to be 15 times relative to the control group and 2.8 times relative to the same indicator before dentures (Table 15).

In patients requiring fixed prosthetics, and in the oral fluid of TT workers, the activation of free radical oxidation of lipids was accompanied by a decrease in the power of antioxidant protection. A decrease in the antiperoxide activity of saliva was detected, which was 1.36 times lower than the control level. In the dynamics of adaptation to prostheses, starting from the second week of research, a restoration of the activity of enzymes of the antioxidant system was detected, which was manifested by an increase in its activity to control values (Table 16, Diagram 11).

Table 16

Antiperoxide activity of the saliva of TTZ workers and the content of protein and lipids in it in the dynamics of adaptation to fixed dentures.

Duration of the study	APA, nmol H <sub>2</sub> O <sub>2</sub> /ml saliva .mi n	mg/ml saliva Total protein, mg/ml	Total lipids, mg/ml
Control group (city) Tashkent)	34,3±0,8	0,13±0,002	6,5±0,3 7
People with intact dentition	25,3±0,78	0,087±0,00 6	9,20±0, 37

Before prosthetics	25,2±0,6	0,111±0,00 6	4.9±0,3
--------------------	----------	-----------------	---------

The noted changes in the activation of free radical oxidation of lipids and a decrease in the power of antioxidant defense manifested themselves against the background of a relative stationarity of the amount of lipids in the blood, i.e. with a stable amount of oxidation substrates.

It should be noted that against the background of a sanitized oral cavity, the content of total protein in the oral fluid is significantly reduced, which is apparently due to the absence of an inflammatory process and less leaching of plasma proteins into the oral fluid. This is apparently confirmed by the increase in protein content in the oral fluid in the early stages after prosthetics. The denture, being a strong mechanical irritant, somewhat injures the mucous membrane, and we found an increase in the content of total protein in the first week. In the subsequent periods after using the prosthesis, the inflammatory phenomena subsided and normalization of the indicator was detected (Table 17).

Thus, prosthetics with fixed metal and removable dentures with a frame made of alloys containing pro-oxidant microelements Co, Fe, Cr restores the indicators of LPO-AOS and optimizes the course and timing of the period of adaptation to dentures in medical workers.

## BIBLIOGRAPHY

1. Abduazimov A.D. To the mechanism and development of diseases of the oral cavity of workers in the production of copper, zinc and lead //Hygiene and morbidity in the metallurgy of copper and nickel. -Ekaterinburg, 1992. -P.49-50

2. Abe T., Nagase S. Synthetic reactions using hydrogen fluoride, fluorine and methods for their implementation. Nagaya Institute of Industrial Technology (Japan). Publishing house "Mir". 1990. -P.51-54

3. Avtsin A.P., Zhavoronkov A.A., Rish M.A., Storochkova L.S. Human microelementoses: etiology, classification, organopathology. M.: Medicine, 1991

4. Averko-Antonovich, I.Yu. Methods for studying the structure and properties of polymers / I.Yu. Averko-Antonovich, R.T. Bikmulin. Kazan: -2002. - 604 s.

5. Adaptive reactions of the dental system of patients during prosthetics / A.I. Volozhin, A.B. Denisov, I.Yu. Lebedenko and others // Ros. dentist magazine 2004. - No. 1. - P. 4-9.

6. Akimov, S.I. The influence of dentures on the condition of the prosthetic bed and the oral environment: abstract of thesis. dis. . Ph.D. honey. Sciences/ S.I. Akimov. -Tashkent, 1979. 25 p.

7 Allergic diseases: diagnosis and treatment: trans. from English / R. Patterson et al. / rep. ed. I.S. Gushchin et al. M.: GEOTAR medicine, 2000. - 733 p.

8. Agarkov V.I., Artemov A.A., Vankhanen V.V. and others. Caries: risk factors and fluorides. -Donetsk, 1995. -96 p.

9. 11. Alieva E.G. Some features of the working conditions of workers in electrolysis workshops of aluminum production and the influence of magnetic fields on the microcirculatory bed: Diss. Ph.D. honey. Sci. -Dushanbe, 1997

10. Alimsky A.V. The need for dental care among schoolchildren born and permanently residing in the hotbed of industrial dental fluorosis // Management, organization, socio-economic problems of the country's dental service. -M., 1991. - S. 148-151

11. Alimsky A.V. Main directions and prospects for the development of scientific research on the organization of dental care // Prospects for the development of modern dentistry. -Ekaterinburg, 1997. -P.3-5

12. Alimsky A.V., Bazgiin A.A., Borisov A.M. etc. Endemicity of dental fluorosis and problems of organizing dental care

//Management, organization, socio-economic problems

13.. Akhmedov A.A. The state of health of the population in the area contaminated with fluorine-containing emissions from the Tajik aluminum smelter //Hygiene and sanitation. -2001. -№2.- P.35-38

14.. Avaliani S.A. Environment. Health risk assessment (world experience) / S.A. Avaliani, M.M. Andrianova. – M.: Vlados-Press, 1999. – 158 p.

15.. Annenkov P.R. hygienic assessment of the habitat and health of the population of a large industrial district of a metropolis: Abstract of thesis. diss. . Ph.D. - M., 1999, - 24 p.

16. Annenkov P.R. Hygienic assessment of the living environment and health of the population of a large industrial district of a metropolis: Diss. . Ph.D., - M., 1999, - 165 s.

17. Ananyev A.V., Shvets A.A. and others. The influence of atmospheric air pollution in Russian cities on population morbidity rates // Collection: Environmental safety of cities. - St. Petersburg, 1993. - P. 31

18. Anifaev T.A. The condition of the oral cavity in iron ore production workers: Abstract of thesis...candidate of medical sciences: 14.00.21. – K., 1971. – 27.

19. Borchalinskaya K.K. Dental morbidity in children and indicators of environmental pollution / K.K. Borchalinskaya, T.A. Smirnova, T.A. Kozicheva // Dental Forum. – 2009. – No. 2 (30). – pp. 22-27. 1.

20. Babajanov JI.A. Prevalence of periodontal diseases and oral mucosa and organization of dental care in rural areas // Dentistry. -1990. -No. 6. P.76- 78

21. Babaev A.B. The most important hygiene problems of an aluminum smelter

//Materials II Scientific and practical. conf. “Current issues of clinical medicine and postgraduate training.” -Dushanbe, 1996. -P.25-26

22. Babaev A.B., Alieva E.G. Some aspects of the functional state of the body of workers in the electrolysis shops of the Tajik aluminum smelter // Materials of the 1st Congress of Health Workers of the Republic of Tajikistan. T.21, Dushanbe, 1997. -P.245-246

23. Barannik N.G. Features of neuroendocrine relationships in patients with lichen planus of the oral mucosa

//Science in practice. -M., 1998. -P.108-110

24. Bakhmudov B.R., Bakhmudova Z.B. Prevalence and intensity of caries and sanitary and hygienic habits of oral care in pregnant women // Dentistry. - 2000. -No. 3. -P.12-14

25. Bakhromova 3. X-ray picture of the skeletal system and joints of workers directly involved in aluminum production // Coll. scientific works Tajik Research Institute prof. medicine. Dushanbe, 2001. -P.69-73

26. Bezrukova I.V. New approaches to the treatment of lichen planus depending on clinical and laboratory parameters //Science in practice. -M., 1998.- P.113-116

27. Bekzhanova O.E., Mamadova F.Sh., Mirzakhililova F.M. Dental morbidity in the rural population of the Uzbek SSR //Management, organization, socio-economic problems of the country’s dental service. Proceedings of TsNIIS - M., 1991.-P.23-26

28. Belaya N.I. Study of the impact of dangerous harmful environmental factors on the excretory system. In the book: Impact of dangerous and harmful environmental factors on the human body. T.2.-1997. -P.211- 264
29. Borovsky E.V., Evstigneeva Ch.L. Prevalence of dental caries and periodontal diseases based on survey data from two regions //Dentistry. -1997. -No. 4. P.64-66
30. Valova G.A., Polzik E.V., Shcherbakov S.V., Guryeva S.L. Risk factors for fluorosis in aluminum and cryolite smelter workers //Hygiene and Sanitation. - 1993. -No. 4. P.22-25
- 31.. Vilova A.V., Zenovsky V.P. Epidemiological incidence of dental caries in the indigenous and newcomer population of the Arkhangelsk region
32. The influence of drinking water quality on the condition of the human dental system. // Collection of abstracts of the anniversary scientific and practical conference "Decade of the environmental service of the Russian Federation. Problems. Solutions. Prospects" Administration of the Chelyabinsk region. - Chelyabinsk. -1998 // - p. 115 - 116.
33. Vuraki K., Ioffe E., Nesmeyanov A. Prevention of dental caries with fluoride preparations // New in dentistry. -1994. -No.4.-P.6-10
34. Vysochin V.I. Dental diseases and the level of temporary disability of miners in contact with trinitrotoluene / IN AND. Vysochin // Dentistry. – 1991. – No. 5. – P. 82 – 83.
35. Garazha N.N., Shatskaya N.V. Organization of primary prevention to prevent damage to hard dental tissues in persons who have industrial contact with cadmium salts // Dentistry. -1996. -WITH. 17-18
36. Genkin A.I., Glotkov N.A., Zhdkhina K.S. and others // Pharmacology and toxicology. -1993.-No.3.-P.97-99
37. Grudyanov A.Ch. Principles of organizing and providing medical care to persons with inflammatory periodontal diseases: Dis. Dr. med. Sci. -M., 1992.-P.57-109
38. Grudyanov A.Ch., Kiryukhina S.A., Maslennikova G.V. and others. Age-related dynamics of the periodontal condition in adults // Dentistry. -1990. - No. 4. - P.70-71
- 39.. Glazunov O.A. The influence of iron ore dust on the body condition and dental status of mining industry workers (literature review) / O.A. Glazunov, S.O. Glazunova // News of Dentistry. – 2008. – No. 3. – P. 97-102. Gafarov D.R. Comprehensive assessment of factors environment and public health in Naberezhnye Chelny: Author's abstract. diss. . Ph.D. - Kazan, 1998, - 16 p.
- 40.. Air hygiene // Methodological manuals / Ed. A.M. Lakshina.-M., 1997.- 35 p.
- 41.. Hygienic assessment of the state of the environment and public health in Moscow // Sat. works of the Scientific Research Institute of Human Ecology and Environmental Hygiene named after “A.N. Sysin” / Ed. Sidorenko G.I. - 1997. - 231 p.

42.. Gildenskiold R.S. and others. System of hygienic optimization of the environment and protection of the health of the urban population // Healthcare of the Russian Federation, 1991.-No. 4,- P.20-22

43.. Gladkikh A.M. Hygienic assessment of the risk to public health due to increased anthropogenic load of the environment.: Author's abstract. diss. . K.M.N.- M., 1999.- 24 p.

44.. Gladkikh A.M. Hygienic assessment of the risk to public health due to increased anthropogenic load of the environment: Diss. . K.M.N.- M., 1999.- 115 p.

45.. GN 2.1.6.695-98 Maximum permissible concentrations (MPC) of pollutants in the atmospheric air of populated areas // Ministry of Health of Russia, 1. M., 1998.-69 s

46.. GN 2.1. 696-98 Approximate safe exposure levels (SAEL) of pollutants in the atmospheric air of populated areas, - Ministry of Health of Russia, M., 1998, - 131 p.

47. Gorelik D.O. and others. Monitoring of atmospheric pollution and emission sources, - M., 1992, - 432 pp.

48. Diagnosis and orthopedic treatment using endoprosthetics for a patient with a mixed tumor of the maxillofacial area. // Military-medical Academy. Collection Current issues of maxillofacial surgery and dentistry, St. Petersburg - 1997, pp. 51-52 (Filimonova O.I., Bulycheva E.A.)

49. Elovikova T.M. Analysis of the work of the periodontal center of the USMA //Prospects for the development of modern dentistry. -Ekaterinburg, 1997.- P.6-9

50. Erina S.V. Organization of treatment of periodontal diseases at a large industrial enterprise // Dentistry. -1987. -No. 4. -P.70-71

51. Zubachik V.M. Misteva humoral antibacterial resistance in patients with generalized periodontitis / V.M. Zubachik, M.V. Lisnichuk, G.O. Potyomkina//Modern dentistry. – 2009. – No. 31 (45). - With. 44-48.

52. Israliev Kh.I., Abduazimov L.A. Clinical and morphological condition of the oral mucosa of workers at the Almalyk copper smelter //Stomatologiya. - 1999 No. 2. -P.22-24

53. The use of titanium alloys in the orthopedic treatment of eco-dependent dental lesions.// Collection of scientific reports of the All-Russian Symposium “Dentistry of the XXI century: the latest technologies and materials.

Perm, 2000. p. 163 - 164. (Filimonova O.I.)

54.. Kondrik E.K., Sergeeva N.A., Kavyzina L.I. Ecological and hygienic problems of aluminum smelters //Hygiene and Sanitation -1993 - No 8 -C 7-

55. Kranokutskaya Z.E. State of lipid peroxidation and antioxidant protection of women working at TadAZ //Sb. scientific works of the Tajik Research Institute of Professional Medicine. - Dushanbe. - 2001.

56. Krazhan I.A., Garazha N.N. Justification of the need for the prevention of oral diseases among workers of chemical production producing liquid complex fertilizers // Dentistry. Specialist. release. -1996.-P.26-27

57. Kuzmina E.M., Vasina S.A., Petrina E.S. and others. Dental morbidity in the Russian population and principles of planning prevention programs // Dentistry. release. -WITH. 11-12 1996. -Special.

58. K.A. Lebedev Causes of intolerance to dental materials / K.A. Lebedev, N.B. Zhuruli, I.D. Ponyakina [and others] //Dentistry for everyone. 2007. - No. 2. - P. 18-23. 59. Leonova L.E., Nekrutenko L.A., Aksenova V.M. and others. The state of periodontal hemodynamics, the hemostasis system and lipid peroxidation in patients with hypertension. Development prospects // modern dentistry. Ekaterinburg, 1997. -S. 96-100

60. Leontiev V.K., Petrovich Yu.A., Kruglova L.N. On the nature of the impact of certain chemicals on the activity of the microflora of soft dental plaque // Dentistry. 1997. -№3. -P.5-6

61. Lepilin A.V. The influence of removable lamellar dentures made of plastic on acrylic structural and functional properties of cell membranes of the oral mucosa / A.V. Lepilin, V.I. Rubin, N.G. Proshin // Dentistry. 2003. No. 1. P. 51-54.

62. Leus P.A. Dental health by the year 2000 and in the longer term // Science and practice. -M., 1998. -P.70-73

63. Lukinykh L.M. Prevention of major dental diseases in the conditions of a large industrial city: Dis. Dr. med. Sci. -N. Novgorod, 2001

64. Makeeva I.M. The influence of environmental factors on the condition of organs and tissues of the oral cavity in children: Abstract of thesis. dis. Ph.D. honey. Sci. -M., 1992. - 25p.

65. Mamedova F.M., Bekzhanova O.E., Mirzakhililova Ф.М. rural Dental morbidity among the population of the Uzbek CCP organization, // social management, economic problems of the country's dental service. -M., 1991. -P.23-26

66. Manukhina O.N. Clinical course of lichen planus of the oral mucosa against the background of decreased functional activity of the thyroid gland // Science in practice. -M, 1998. -C. 145-147

67. Mashkilleyson A.L. Diseases of the oral mucosa. - Moscow, 1992. - P.10-17

68. Meshcheryakov V.P. The effect of magnetic fields of TadAZ on workers // Target scientific and technical. work program to reduce TadAZ emissions of pollutants into the environment. -Tursunzade, 1991. -P.167-173

69. Morozova M.M. Changes in periodontal tissue due to industrial exposure to pesticides:

Author's abstract. dis. Ph.D. honey. Sci. -Perm, 1993. -21c. 70. Mukhametova E.Sh. Rationale for comprehensive prevention of dental diseases in

preschool children living in a city with a developed petrochemical industry: Abstract of thesis. dis. Ph.D. honey. Sci. -Kazan, 1992. -19 p.

71. Myagkova N.V. The state of the dental system in young men of military age // Prospects for the development of modern Ekaterinburg, 1997.-P.235-237 dentistry.

72. Novikov Yu.V., Kutsenko G.I. and others. Modern ecological and hygienic problems of the human environment and improvement of sanitary and epidemiological "Rorag", 1997. - 477 p. supervision.- M., TOO

73.. Novikov Yu. V., Podolsky V.M. Habitat and people, - M., "Rorag", 1994.-385 p.

74.. Novikov Yu.V. and others. Dioxins in the human environment are a new hygienic problem // Hygiene and Sanitation, 1994, No. 3.- P.36-40.

75. Nabidzhanova E.N., Olimova S.O. Features of manifestations of the toxic effects of fluoride compounds // Problems of gastroenterology. Institute of Gastroenterology of the Academy of Sciences of the Republic of Tajikistan. - Dushanbe, 1993. -No. 2. -WITH. 12-17

76. New designs of permanent dentures for diseases of the temporomandibular structure. // conferences. Theses of scientific-practical Snezhinsk. 1998. (O.I. Filimonova, E.A. Bulycheva). Reducing the harmful effects of ionizing radiation on oral tissues through a balanced diet. // Materials of the First Ural Scientific and Practical Conference. Issue 1. And Current problems of medical science, technology and professional education. -Chelyabinsk. - 1999 - p. 51-52. (Filimonova O.I).

77. Onishchenko G.G., Chiburaev V.I. On the sanitary and epidemiological situation in Russia // Materials of the VIII All-Russian Congress of Hygienists and Sanitary Doctors / Ed. Potapova A.I. M., 1996, T 1.- P.3-7.

78. Experience in creating an anesthesiology service in a dental clinic. OAP "Chelyabinsk resort" - Collection //Resort and preformed physical factors in disease prevention and population health, Chelyabinsk, 1996, p. 38 39. (Filimonova O.I., Trostin V.S., Tolstikhina Z.R.)

79. Experience in replacing defects in dental crowns with veneers. (Filimonova O.I., Tyutikova E.G.)

80. Organization of dental care for military personnel of the Ural Military District. II Abstracts of reports of the scientific-practical conference of the medical unit of ChelPipe. - Chelyabinsk. 1998. p. Application (O.I. Filimonova). adhesive splinting structures in the treatment of periodontal diseases. // Abstracts of reports of the scientific-practical conference of the medical unit of ChelPipe. Chelyabinsk 1998. p. 110-111 (O.I. Filimonova).

81. Orthopedic methods in the complex treatment of periodontal diseases // Abstracts of a scientific and practical conference. Snezhinsk - 1998 (O.I. Filimonova).

82. Medical Dissertations <http://medical-diss.com/medicina/vliyanie-tehnogennyh-faktorov-na-stomatologicheskuyu-zabolevaemost-i-optimizatsiya-stomatologicheskoy-pomoschi-naseleniyu#ixzz6PubKcmJo>

83. Paranko N.M., Rublevskaya N.I. Hygienic characteristics of heavy metal pollution of the environment of an industrial region and the immune status of children // Hygiene and Sanitation, 1999.- No. 2.- P.51-54. 84. Pashev Ch.A., Akhmedov R.M. The influence of fluorine and other biogeochemical factors on the microhardness of enamel and dentin // Dentistry. 1990. -№6.- P.10-12

85. List of substances, products, production processes, household and natural factors that are carcinogenic to humans // Hygienic Standards, - M.: FC GSEN Ministry of Health of Russia, 1999, - 23 With.

86. Pimenov S.V., Bogatsky V.A., Alimsky A.V. The influence of ionizing radiation on the condition of the oral cavity and teeth among military construction workers and liquidators of the accident at the Chernobyl nuclear power plant // Science in practice. -M., 1998. -P.82-85

87. Position 0 monitoring. social and hygienic Appendix of the State Committee for Sanitary and Epidemiological Supervision of Russia to Order No. 145, approved by Decree of the Government of the Russian Federation of October 6, 1994 No. 1146. - 165 p.

88. Resolution of the Government of the Russian Federation approving regulation 0 "On social and hygienic monitoring" M., 2000, - 144 p.

89. Polzik E.V., Valova G.A., Zinger V.E., Sysoeva J1.A. Some problems of medical and biological prevention of occupational fluorosis // Occupational Medicine and Industrial Ecology. -1995. -No. 5. -C.44-47

90. Pomoinitsky B.G. Clinical organizational foundations of therapeutic and preventive care for patients with pathology

periodontal disease in the area of industrial development: Abstract of thesis. dis. Dr. med. Sci. -M., 1990. -39c.

91. Ponomareva N. A., Shlezankevich V. M., Zenova V. V. Adaptation to dentures // Young scientist. - 2018. – No. 21. pp. 177-179.

92. Damage to teeth in children. // Materials of the First Ural Scientific and Practical Conference. Issue 1. // Current problems of medical science, technology and professional education. Chelyabinsk. 1999

93. Prevention of dental diseases // Textbook / Under. ed. Kuzmina E.M. - M., 1997. - 136 p.

94. Increasing the efficiency of dental prosthetics for workers of phosphorus and sulfuric acid production. Collection of abstracts of the international scientific-practical conference "Modern aspects of the prevention and treatment of dental diseases" M., 2000. p. 211 (Filimonova O.I., Rogozhnikov G.I.) 212.

95. Practical steam odontology / Scientific and methodological publications// A.V. Borisenko, M.Yu. Antonenko, L.F. Sidelnikova. Media", 2011.-472c K.: TOB "Dr.

96. Ravinskaya A.A. Program for the prevention of major dental diseases among chemical production workers: Author's abstract. dis. Ph.D. honey. nauk.-M., 1998. -29p.

97. Razumov V.V., Klitsenko O.A., Rykov V.A. and others. Morphogenesis of osteopathy in occupational fluorosis // Occupational Medicine and Industrial Ecology - 1997. -No. 4. -WITH. 18-23

98. Ramm N.L., Kiselnikova L.P. Preventive measures for patients at the stages of orthodontic treatment with fixed appliances//Prospects for the development of modern dentistry. Ekaterinburg, 1997. P.237-241.

99. Revich B.A. The state of health of the child population of Moscow in connection with air pollution // Ecological studies in Moscow and the Moscow region, - M.: INION, 1990, - P.95-108

100. Regional problems and health management of the Russian population // Ed. Belyakova V.D. - M., 1996. - 436 p.

101. Regional health problems of the Russian population // Ed. Belyakova V.D. - M., 1993, - 334 p.

102. Resolution of the All-Russian conference "Ecology of large cities: ways out of the environmental and demographic crisis, taking into account the recommendations of the UN World Conference on Settlements - HABITAT // and WHO." - M, 1997.-283 p.

103. Romanenko N.A. Sanitary protection of soil and public health // In the book: Regional problems of public health in Russia, - M., 1993.- P.64-72

104. Guidelines for the control of atmospheric pollution // Guiding documents, - M., 1991. - 687 p.

105. Rudenko A.Ya., Gorobets Yu.I. On the growth trend of noise pathology among workers at industrial enterprises in Krivbass / Abstract. report scientific - practical conf. "Current issues of hygiene, occupational physiology and proypathology in industry" - Krivoy Rog, 1995. - P. 48.

106. Yu.G. Romanova, I.K. Novitskaya, V.V. Vit EFFECT OF METHYL METHACRYLATE HA ON THE MUCOSA OF THE ORAL CAVITY (MORPHOLOGICAL STUDY). EXPERIMENTAL MEDICINE. 2012. No. 4 (57) I CLINIC

107. Comparative hygienic assessment of working conditions at mining enterprises industry of Krivbass / O.I. Gural, V.S. Beletskaya, E.G. Bichevskaya, P.Yu. Rybkin // Improving the environmental and industrial environment of the Dnieper region: region. scientific-practical

Conf.: abstract. report – D., 1993.- P. 20-21 108. Savilov E.A. Methodological hygienic pollution basis for assessing the influence of the technogenic environment on infectious morbidity // Author's abstract. diss. Doctor of Medical Sciences, - Irkutsk, 1994. - 28 p.

109.. Sanitary standards for permissible noise levels in the workplace No. 32-23-85, - Ministry of Health of the USSR.

110. SanPiN 2.07.01.V89 "Urban planning. Planning and development of urban and rural settlements", - 324 p.

111. Complex jaw prosthetics for patients with jaw defects using depositing endoprotheses. // Materials of the II Ural Scientific and Practical Conference. Issue 2. Current problems of medical science, educational technologies, p. 43 - And professional 45. (Filimonova O.I.)

112. Serdarov O. Comprehensive hygienic characteristics of air pollution in Ashgabat and quantitative assessment of its impact on public health // Author's abstract. diss. Doctor of Medical Sciences, St. Petersburg, 1993, 35 p.

113. Sidorenko G.I. Environmental hygiene in modern conditions // Hygiene and Sanitation, - 1992, - No. - P.5-10

114. Sidorenko G.I. and others. Methodological and methodological problems of assessing the health status of the population. - St. Petersburg, 1992. - 461 p.

115. Sidorenko G.I. Problems of human ecology and environmental hygiene in Moscow // Hygienic assessment of the state of the environment and public health in Moscow / Pod. ed. G.I. Sidorenko.- M., 1997.- P.5-11.

116. Strochenko E.A. The state of oral hygiene among workers of the Ilyichevsk commercial sea port / E.A. Strochenko, V.Ya. Skiba // Proceedings of the conference "Science and practical aspects of individual and professional empty mouth hygiene in children and adults", 14-15 April 2009. Odessa: Apricot, 2009. – pp. 108-109.

117. Dental morbidity and ways to reduce it among the population living in areas contaminated with radionuclides Proceedings of the conference of dentists Development prospects // modern dentistry; problems of the Ural region Ekaterinburg UGMA TsNIIS Ministry of Health of the Russian Federation. - 1997. - p. 42 46. (O.I. Filimonova, G.I. Rogozhnikov, F.A. Abdeeva).

118. Relationship between the state of the human dental system and the environmental situation in small towns of the Southern Urals. Collection of abstracts of the anniversary scientific-practical conference "Decade of the environmental service of the Russian Federation. Problems. Solutions. Prospects" Administration of the Chelyabinsk region. Chelyabinsk. 1998. p. 115 - 116.(O.I. Filimonova, E.A. Bulycheva).

119. Babov E.D. Dental illness of ammonia poisoning practitioners / E.D. Babov, I.O. Mikhailenko // News of Dentistry. – 2008. No. 1. - P. 21-22.

120. Zubachik B.M. Pathogenetic significance of dysfunction of the microcirculatory endothelium of the periodontal bed in the formation and transition of generalized periodontitis / V.M. Zubachik, Yu.B. Riznik Modern dentistry. – 2013. – No. 4. – p. 50-53.

121. The role of microflora in the pathology of the oral mucosa / I.M. Rabinovich, G.V. Banchenko, O.F. Rabinovich [etc.] // Dentistry. – 2002. – No. 5. – P. 48-50.

122. Beknazarova GM. Hygienic assessment of working conditions in various aluminum production workshops and the influence of harmful factors on the mucous membrane of the upper respiratory tract. *Avicenna's Bulletin*. 2012;2:142-6.

123. Galiullina EF, Samsonov VM, Bulyakov RT, Shakirov DF. The chemiluminescence method as a criterion assessment of the impact of unfavorable factors in the production environment on the oral cavity of rubber and rubber workers Russian 2013;5:42-5. *industry. dental magazine*.

124. Nasridinov A.A. Physiological and hygienic assessment of the working conditions of builders during the construction of the turbine hall and hydraulic tunnels. *Avicenna's Bulletin*. 2010;4:147-51.

125. Makeeva IM, Avdeenko OE. Features of the dental status of industrial enterprises. 2016;1:64-5. *Dentistry workers*.

126. Simonova NI, Galikeeva AS, Stepanov EG, Bayazitova GI. Analysis of the influence of lifestyle, work environment and psychosocial stress on the formation of chronic generalized periodontitis. *Russian dental magazine*. 2013;5:49-51.

127. Kabirova MF. The state of free radical oxidation of oral fluid in petrochemical production workers. *Ecology health*. 2011;1:76-8.

128. Kovalchuk L.V. The role of cytokines in the mechanisms of development of chronic

129. inflammation in periodontal tissues / L.V. Kovalchuk, L.V. Gankovskaya, M.A. Rogova // *Immunology*. - 2000. No. 6. - With. 24-26

130. Kulygina V.N. Sanatorium-resort treatment of generalized

131. periodontitis in patients with vibration disease: abstract of thesis. for the scientific competition. Ph.D. degrees honey. Sciences: spec. 14.00.21 Dentistry / V.N. Kulygina. -Kiev, 1988. – 167 p.

132. Agafonov AA, Dautov FF, Blashkova SL. Risk factors for the health of workers in thermal power plant workshops. *Basic research*. 2012;12(2):211-4.

133. Chemikosova TS, Gulyaeva OA. Substantiation of occupational causes of diseases of the oral mucosa with the phenomena of dyskeratosis y chlorophenoxy herbicides. 2005;35(2):37-8. *workers in the production of Periodontology*.

134. Kiseleva EA, Elbakidze AZ. The structure of the pathology of periodontal tissues and the homeostatic effects of saliva in miners. *Periodontology*. 2012; 62(1):52-6.

135. Olesova VN, Khavkina EY, Soltar IV, Makeev AA, Sorokoumov GL, Bersanov RU. The effectiveness of dental medical examination and annual sanitation of the oral cavity in organized teams of workers of industrial enterprises. *Russian dental journal*. 2008;4:46-8.

136. Olimov SSH, Gafarov SA. Diseases of hard dental tissues among workers of the Mubarak gas processing plant. Russian dental journal. 2008;6:39-40.

137. Experience in creating an anesthesiology service in a dental clinic. // OAP "Chelyabinsk resort" - Collection Resort and preformed physical factors in disease prevention and population health, Chelyabinsk, 1996, p. 38-39. (Filimonova O.I., Trostin V.S., Tolstikhina Z.R.)

138. Weisgeim LD, Lyumkis EV. Organization of dental care as a social problem. Bulletin of VolSMU. 2006;1:8-10.

139. Kudryavtseva VP, Samsonov VM, Kamilov RF, Shakirova ED. Working conditions for workers of the main professions engaged in the production of rubber and rubber products. Medical Bulletin of Bashkortostan. 2011;4:10-3. Khanov TV, Mirsaeva FZ, Shakirov DF. Application of the chemiluminescence method to study the influence of harmful and dangerous factors in the working environment on the composition of mixed saliva in industry. petrochemical workers Russian dental journal. 2009;5:40-1.

140. Yu.G. Romanova, E.L. Zagradskaya, E.A. Strochenko INFLUENCE OF ADVERSE ENVIRONMENTAL FACTORS ON THE STATE OF HOMEOSTASIS OF DENTAL PATIENTS CO PATHOLOGY.

Ukrainian dental almanac. 2016. No. 1 (Vol. 2). C.33-35

141. Sorokoumov GL, Uiba VV, Reva VD. Indicators of the dental status of enterprise employees with radiation-harmful working conditions. Dentistry. 2008;1:79-82.

142. Smolyar N.I., Ketzman I.N., Kolesnichenko A.V. and others. Dental caries in preschool children living in rural areas // Dentistry. 1990. -№2. P.58-60

143. Sokolov A.D., Domnik S.G. Hygienic assessment of harmful emissions into the atmosphere of the main shops of electrode plants // Occupational Medicine and ecology. 1997. - No. 4. -P.24-36

144. Soliev F.G., Asadulloev S.Kh., Radzhabov N. Indicators of occupational morbidity among workers of the Tajik aluminum plant // Collection of scientific works. works of the Tajik Research Institute prof. honey. Dushanbe, 2000. -P.165-168

145. Solntsev A.S., Grigorenko S.M., Zhelnina L.V. and others. The state of dental care for the population in different regions of the Krasnoyarsk Territory // Management, organization, social and economic problems of the country's dental service. -M., 1991. -P.20-22

146. Solovyova A.M., Kovalevsky A.M., Kotyurova O.J1 et al. Study of the role of locally acting factors in the development of gingivitis in young people

age //Dentistry. Specialist. release. -1996. -P.78-79 147. Sulemanova M.A. Reproductive health workers of the Tajik aluminum smelter and women living in the region of its influence. Author's abstract. dis. Ph.D. Dushanbe, 2000. -P.3-4

148. Suniev T.K., Aldasheva M.A. Principles of organizing the prevention of major dental diseases in modern conditions//Problems of dentistry. 1998. -№1.- P.14-16

149. Toydzhanova D.D., Rabinovich I.M., Alimsky A.V. Sociological survey of cotton processing industry workers//Science in practice. -M., 1998. - P.93-95 150. Titov P.L. Allergic reactions and intolerance to materials used in the clinic of orthopedic dentistry / P.L. Titov, P.N. Moiseichik, G.P. Bogdan // Modern.

dentistry. 2010. - No. 1.

151. Khairuloev P., Khodzhiev M. Functional state of the body of burners // Coll. scientific works of the Tajik Research Institute prof. medicine. Dushanbe, 2000. P.75-77

152. Umarova, S.E. Clinical and laboratory assessment of adaptation processes in patients with solid-cast fixed dentures: abstract of thesis. dis. Ph.D. honey. Sciences/S.E. Umarova. -M., 2000. -23 p.

153. Device for the treatment of diseases of the oral cavity. // Certificate for utility model No. 12346 dated January 10, 2000. Moscow. Filimonova O.I. Device for the treatment of oral diseases. // Certificate for utility model No. 2959 dated March 20, 2000, Moscow. (Filimonova O.I., Kharunzhin V.V., Baev A.A.)

154. Khairyuev P.D. Features of clinical manifestations of chronic bronchitis IA in aluminum production workers, // collection. scientific works Tajik" 1 pi Research Institute - Dushanbe. - 2001. - P. 372-376 of professional medicine.

155. A.V. Tsimbalistov Immunological aspects of the pathogenesis of intolerance to dental construction materials /, E.S. Mikhailova, N.V. Shabashova [etc.] // Dentistry. 2006. - No. 4. - P. 66-68.

156. Tsepov L.M. Periodontal pathology in systemic diseases / L.M. Tsepov, A.I. Nikolaev, E.L. Tsepova [etc.] // Maestro of Dentistry. 2009. No. 1 (33). – pp. 64-67.

157. YuZ.Shinberg O.E., Sahakyan Sh.H., Zapashnik E.K. Functional overload of the periodontium in case of malocclusion in adults // Dentistry. -1991. -No.6.-C.42-43

158. Shcherbakov, A.S. Dynamics of acid-base balance B in the oral cavity in patients with orthopedic structures / A.S. Shcherbakov, V.A. Rumyantsev, I.S. Stoyanova //Dentistry. 2004. No. 2. - P. 7-10. 159. The effectiveness of using collost gel in combination with antibacterial drugs for the treatment of periodontitis/ G.M. Barer, V.N. Tsarev, O.O. Yanushevich, Periodontology. -2002,- No. 3. pp. 62-64.

160. The effectiveness of treatment of periodontal diseases with adhesive splinting structures in the population living in the Ural region. // Materials of the scientific and technical conference "Regenerative medicine: rehabilitation and sanitary-resort treatment of the population affected by man-made disasters (nuclear, environmental) in the conditions of the Southern Urals. - Chelyabinsk. 1999. (Filimonova O.I.) 5. Prevention and reduction psycho-emotional stress at a

dentist's appointment for patients living in areas with a high anthropogenic load. // Materials of the scientific and technical conference "Restorative medicine: rehabilitation and sanitary-resort treatment of the population affected by man-made disasters (nuclear, environmental) in the conditions of the Southern Urals. - Chelyabinsk. - 1999. (Filimonova O.I.)

161. Yudin, P.S. orthopedic Minimally invasive treatment methods Using superelastic alloys/ P.S. Yudin // Ros. dentist magazine 2003. - No. 3. - P. 4-6.

162. Yadgarova L.R., Akhmedov A.A. Fluorides and their effects on the body: //Sb.scientific works of the Tajik Research Institute of Occupational Medicine. -Dushanbe.-2000.-P.90-96

164. Ahrens G., Bublitz K.A. Parodontalerkrankungen und Behandlungsbedarf der Hamsburger Bevolkorung/ZDeutsche Zahnaret. 1987. - Bd. 42, No. 5.S. 433-437.

165. Belloni E., Resta G., Cattaneo V. Indagine epidemiologica sulle malocclusioni nellapopolazione scolastica di un came senso montano // Minerva Stomat. 1981. -Vol3 0.-№4.-P. 209-304.

166. Benamghar L., Martin J., Abt F, Sardo-Infirri J. Dete nation epidemiologique des besoms en soins parodontaux d'une population. Metodologie: un nouvel mdice global. CPITN //Ann. Med. Nancy. 1985. Vol. 111. - No. 3. - P.227-230..

167. Blinkhorn A.S., Cumms J. Macmillan A.S., Malley G.O. Dental health of a sample of Glasgow adolescents // Brit. Dent. J. 1985. -Vol. 158. - № 12. - P.436-439.

168. Blomlof L., Hammarstrom L., Lindskog H. Occurrence and appearance of cementum hypoplasias in localised and generalized juvenile periodontitis // Acta Odontol. Scand. -1986. Vol. 44, № 5. - P. 313- 320

169. Dahllof G.; Bjorkman S; Lindvall K.; Axio E.; Modeer T, Department of Pedodontics, School of Dentistry, Karolinska Institute. Stockholm, Sweden. Oral health in adolescents with immigrant background in Stockholm. Swed- Dent-S, 1991; 15 (4); P 197-203.

170. Dvorak J., Mrklas L. Prevalence parodontopatii it despelch obyvatel ekresu Vyskov//Ces. Stomatol. 1986. - Vol. 86, no. 2. - S. 143-149.

171. Diez C., Schwarzburg G., Glockmann E. The results of caries prevention in kindergartens //Dtsch. Zahn. Mund. Kiefer. Zentr.-1992.-Vol.80. - No.7-8.- P.419- 421

172. Duckworth R.M., Gilbert R.J. Intra-oral models to assess cariogenicity: evaluation of oral fluoride and pH I I J. Dent. Res. 1992. - Vol. 71. - Spec. №. - P.934-944

173. Edgar W.M., Higham S.M., Manning R.H. Saliva stimulation and caries prevention //Adv. Dent. Res. -1994. -Vol. 8. - №2. -P.239-245

174. Erickson R.L., Glasspoole E.A. Model investigations of caries inhibition by fluoride releasing dental materials //Adv. Dent. Res. -1995. - Vol.9. - №3. - P.315-331

175. Ensonsu C.O. Review of oral disease in Africa and the Influence of socio- economic factors // Int. Dent. J. 1981. - Vol. 31, № 1. - p. 29-38.
176. Eshleman I.R., Moon P.C., Barnes R.F. J. Prosthet. Dent., 1984. № 51. - P.761-764.
177. Fassman DK. Prenatal fluoridation. A literaturereview //N.Y. State Dent. J. -1993. -Vol. 59. -№6. -P.47-51
178. Fluoride and oral health. //WHO Technical reportseries. -Geneva, -1994
179. Flemmig T.F.; Shanahan F.; Miyasaki K.T. UCLA School of Dentistry Prevalence and severity of periodontal disease in patients with inflammatory bowel diseases. J-Clin-Periodontol; 1991 Oct; 18(9);P 690-697.
180. Gaffar A., Afflitto J. Nabi N. et al. Recent advances in plaque, gingivitis, tartar and caries prevention technology //Int. Dent. J. -1994. -Vol. 44. -№1. -P.6370
181. Gilbert G.H., Heft M.W.; Periodontal status of older Floridians attending senior activity centers. J.Clin Periodontal 19,249-255, 1992.
182. Gendreau L. Epidemiology and etiology of denture stomatitis / L. Gendreau, Z.G. Loewy // J. Prosthodont. – 2011. – № 2. – P. 67–72.
183. Hargreaves J. A. The level and timing of systemic exposure to fluoride with respect to caries resistance//J. Dent. Res. -1992. -Vol. 71. -№5. -P.1244-1248
184. Haugejorden O. Using the DMF gender difference to assess the major role of fluoride toothpastes in the caries decline in industrialized countries //Com. Dent Oral Epidemiol. -1997. -Vol. 25. -№2. -P 192
185. Halcox J. Endothelial dysfunction and prognosis circulation / J. Halcox / 186. Circulation . –2002. – Vol. 106. – P. 653-659.
187. Helfenstein U., Steiner M. Fluoride varnishes (Duraphat): a metaanalysis //Community Dent. Oral Epidemiol. -1994. -Vol. 22.-№1. -P. 1-5
188. Hescot P., Roland E. Fluoridated salt in France//Adv. Dent Res. -1995. Vol. 9. -№2. -P. 144-145
189. Hunt R.S., Levy S.M., Beck J.D.: The prevalence of periodontal attachment loss in an Iowa population aged 70 and older. J Pub Helth Dent 5,252 254,1990.
190. Hohlfeld M., Bersimout Z.P. Telergebaissemer epidemiologischen Untersuchung des Parodontalzustandes bei 45 54jährigen Berliner Probanden // Deutsch Zahnärstl. Z. - 1986. - Bd. 41, № 6. - S. 619-622.
191. Ismail A.I., Hurt B.A., Eklund S.A. Smoking and periodontal disease in the United States // J. Amer. Dent. Ass. 1983. - Vol. 106. - № 5. - P. 617-621.
192. Ismail A.I., Burt B.A., Brunelle J.A. Prevalence of total tooth loss, dental caries, and periodontal disease in mexican-american adults: Results from the southwestern HHANES // J. Dent. Res. 1987. - Vol.66. - № 6. - P. 1183-1188.

193. Jack S.S. // Advance Pata from Vital and Health Statistics. 1986. - № 122. P. 111.
194. Jordan R.D. Epidemiology of main ortodontal diseases // J. Amer. Dent. Ass., 1986.-№ 112.-P. 505.
195. Jager K., Boraer A., Graber C. Epidemiologische Untersuchungen uber die stologic factoren dysfunktioneller Erkrankungen im Stomatognathen system // Schweis. Alschr. Zahnmed. - 1987, - Bd. 97,№ 11. - S. 1391-1356.
196. Jeani H., Schurek, Georgiag A.H. Symptome funkcioneller Storungen in kausystem Erne epidemiologlsche Studie // Schwois. Eschr. Zannmed. - 1987. - Bd., № 11.-S. 1357-1365.
197. Kaldohl W.B., Becker C.M. Prosthetic contingencies for future tooth loss // J.Prosthet. Dent.1985. -Vol. 53, № 1. -P. 1-6.
198. Kosa W. Epidemiogie der gingivitis undperiodontitis und die Notwench igkeit klmischKontrollierter Untersuchungen // Stomat. DDR. 1986. - Bd.36. - № 6. -S.320-325
199. Kolesnik A., Pakhomov G. Different fluoride intakewith milk and its ex cretion in urine in Russianchildren //J. Dent. Res. -1996. -№75. -P. 142
200. Lagerlof F., Oliveby A. Caries- protective factors insaliva //Adv. Dent. Res. -1994. -Vol. 8. -№2. -P.229-238
201. Levy S.M., Baker K.A., Semla T.P., Kohont F.S. //Gerodontics. 1988. - Vol.43.-P. 119-125.
202. Lode D. Prothetish-stomatologische Morbiditatsstudie Senftenberg 1977 und 1978.Stomatol. DDFL 1983. N 33. - S. 641-647.
203. Comparative adaptation accuracy of acrylic denture bases evaluated by two diff erent methods / C.J. Lee, S.B. Bok, J.Y. Bae [et al.] // Dent. Mater. J. – 2010. – Vol. 29. – P. 411–417.
204. Manji F., Fejerskov O. An epidemiological approach to dental caries //Textbook of clinical cardiology. Copenhagen, 1994. -P. 159-177
205. Marks R.G., Conti: A.J., Cancro L. A fluoride dose- response evaluation in an anticaries clinical trial //J.Dent. Res. -1992. -Vol. 71. - №6. -P.1286-1291
206. Martheler T.M. Age- adjusted limits of fluorideintake to minimize the prevalence of fluorosis //J.Biol. B uccale. -1992. -№20. -P. 121-127
207. Mithal A.,Trivedi N., Grupta S., Kumar S., GruptaR. Radiological spect rum of endemic fluorosis:relationship with cacium intake. //Skeletal. Kadiol.-1993 -V. 22 n. 4 - p. 257-262.
208. Morgan M.V., Campain A.C., Crowley S.J. et al. Anevaluation of a pri mary preventive dental programmein non-fluoridated areas of Victoria, Australia //Aust. Dent. J. -1997.-Vol. 42. -№6. -P.381-388
209. Misziczyn M. Fotogrammometria powierzchni kontaktow miedzy zebowych w zwarcim // Protet.Stomatol. 1976. - V. 26., № 6. - S. 407-413.

210. Motsch A. Epidemiologie funktioneller Störungen //Dtsch. Zahnarztl. Z. - 1985.-Bd. 40,№3 .-S. 147-155.

211. Pakhomov G.N., Ivanova K., Moller I.J., et al.Dental caries-reducing effects of a milk fluoridation project in Bulgaria //J. Publ. Health. Dent. - 1995. -Vol. 55. P.234-237.

212. Page R.C.//Gerontology. 1984. - Vol. 3, № 1 ,-P. 63-70.

213. Petersen P.E. Social inequalities in dental health.Towards a theoretical explanation //Comm. Dent.Oral Epidemiol. 1990. Vol. 18, №3 - P. 153-158.

214. Roberts A.J. Role of models in assessing new agents for caries prevention- non-fluoride systems//Adv. Dent. Res. -1995. -Vol. 9. -№3. -P.304-314

215. Seppa L., Pollanen L., Hausen H. Caries-preventiveeffect of fluoride varnish with different fluorideconcentration //Caries Res. -1994.-Vol. 28. -№1. -P.64-65

216. Sheiham A. The epidemiology of dental caries and periodontal disease //J. Clin. Periodontal. -1999. -Vol. 6. -№7. P.7-15

217. Sushula A.K. Adenyl cuclasa activiti followingfluoridi ingestion toxical celt. 1992. - V10. 2-3, p.205-212.

218. Silicone-based composite for relining of removabledental prosthesis/M. Cazacu, C. Racles, A. Vlad etal.//Journal of Composite Materials. 2009. -V. 43,№19.-P. 2045-2055.

219. Scholz J. Das LuckengebiB und dessenprothetischtherapeutische Versorging, untersucht amPatientengut einer stomatologischen Abteilung ineinem landlic hen Versorgungsbereich. Med. Diss.Erfurt 1986.

220. Staudt J., Merker H. J. Funktionale Anatomie und Histologic in Text und Bild. - Berlin: VEB Verlag,1990. - S. 72-76.

221. Strujak-Wysokinska M., Wysokinska-Viszezuk Z. Ocone stann izebionia osob wieku powyzej 50 nkuzycia sanneszkalych na tecenia wojesodztwa Lubelskiego // Czas. Stomat.- 1987.-Vol. 40, № 1,-S.13-18.

222. Szoke J. Apathy Istvan Gyermekkorhaz Rendelointezet, Budapest (Caries epidemiology in Budapenursery schools). Budapesti ovdas gyermekek caries epidemiologiai vizsgalata. Fogorv- Sz; 1991 Jun-Jul; 84 (6-7); P 169-76.

223. Tada, H. Proteolysis of ICAM-1 on human oralepithelial cells by gingipains/H. Tada//J. dent. Res.2003. - V. 82. - P. 796-801.

224. E.B. Tuna Elution of residual monomers from dentalcomposite material s /

E.B. Tuna, O. Aktoren, Y. Oshida, [et al.] // Eur. J. Paediatr. Dent. – 2010. – Vol. 11, № 3. – P. 110–114.

225. Taylor CM., Fiske J., Cooper D., Gelbier C.: Dentalneeds of pre retirement and retired people man in ner- city area. Public Health 108/6,413-417,1994.

226. Vandoras A.P. Incidence of cleft lep, cleftpalate,and cleft lip and palate among races; a review // CleftPalate, J. 1987. - Vol. 24, № 3. - P. 216-225.

227. Weitle T. Ethical isness in geriatric dentistry //Gerontology. 1987. -  
Vol.6,

№2.-P.73-78.

228. Whittle J.G., Sarll D.M., Grant A.A., WormmgtonH.V. // Brit. Dent. J.  
- 1987.-Vol 162.-P. 381-383.

## ***CONTENT***

List of abbreviations	
The influence of unfavorable environmental factors on the formation and course of oral diseases	
Clinical studies of persons employed in metallurgical production	4
1. Clinical and functional studies	45
2. Biochemical studies of the composition of mixed saliva	0
3. Radioactive analysis microelement composition of saliva	2
The course of adaptation processes to various designs of dentures	6
List of used literature	95

Bosishga ruhsat etildi: 16.01.2020 yil.  
Bichimi 60x84 1/8. Vaqt \_ Yangi Roman » raqamli bosma usulida bosildi shrift .

Shartli bosma tabogi 7. Adadi: 50. Buyurtma No 10

100060, Toshkent, Ya.G‘ulomov ko‘chasi, 74.  
Telefon: +998 90 9722279, [www . tiraj . uz](http://www.tiraj.uz)

« YUQORI TASVIR MEDIA »  
bosmahonacida chop etildi.